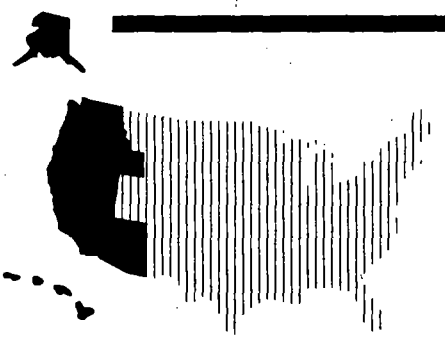
ARCS WEST



Remedial Activities at Selected Uncontrolled Hazardous Waste Sites in the Zone of Regions IX and X

Environmental Protection Agency
Contract No. 68-W9-0031

CH2M HILL

HEALTH AND SAFETY PLAN

Bunker Hill Mine Water Management

EPA CONTRACT NO. 68-W9-0031
WORK ASSIGNMENT NO. 31-84-105G
CH2M HILL PROJECT NO. 148562.05.02

Prepared for:

U.S. Environmental Protection Agency
Region 10
1200 6th Avenue
Seattle, Washington 98101

Prepared by:

CH2M HILL
777 108th Avenue NE
Seattle, Washington 98004

OCTOBER 1998

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CH2M HILL HEALTH AND SAFETY PLAN

(Reference CH2M HILL SOP 19, *Health and Safety Plans*)

This health and safety plan will be kept on the site during field activities and will be reviewed and updated as necessary. The plan adopts, by reference, the standards of practice (SOP) in the CH2M HILL *Corporate Health and Safety Program, Program and Training Manual*, and CH2M HILL's *Site safety Notebook* as appropriate. The site safety coordinator (SSC) is to be familiar with these SOPs and the content of this plan. Site personnel must sign Attachment 1. In addition, this plan adopts procedures in the work plan for the project.

1 PROJECT INFORMATION AND DESCRIPTION

CLIENT OR OWNER: USEPA

PROJECT NO: 106356.

CH2M HILL PROJECT MANAGER: Joan Stoupa

OFFICE: SEA

SITE NAME: Bunker Hill

SITE ADDRESS: Shoshone County, Idaho

DATE HEALTH AND SAFETY PLAN PREPARED: June 1994, updated April 1998

DATE(S) OF INITIAL VISIT:

DATE(S) OF SITE WORK: May 1998 to May 1999

SITE ACCESS:

SITE SIZE: 21 square miles

SITE TOPOGRAPHY: The site lies in the Silver Valley of the South Fork of the Coeur d'Alene River (SFCDR). The Silver Valley is a steep mountain valley that trends from east to west approximately 2250 feet to 4000 feet above mean sea level

PREVAILING WEATHER: Cold and snow in the winter and mild summers. Occasional hot weather in the summertime. The site is in the mountains and local snow or extreme weather at the higher elevations is possible any time of year.

1.1 GENERAL SITE DESCRIPTION AND HISTORY:

The Bunker Hill Superfund site, located in the panhandle of northern Idaho, is a 21 square mile, steeply sloped valley that had been actively mined for lead, silver, and zinc for over 100 years beginning in the late 1800's. The 21-square mile area was placed on EPA's National Priorities List (NPL) in 1982. Remedial design and remedial actions to achieve the requirements of the 1992 Record of Decision were initiated by EPA in 1994.

The Bunker Hill Mining Complex was an integrated mining, milling, and smelting operation, which included the Bunker Mine (lead and zinc), a milling and concentrating operation, a lead smelter, silver refinery, electrolytic zinc plant, phosphoric acid and fertilizer plant, sulfuric acid plants, and a cadmium plant. The complex occupied total of 350 acres between the towns of Kellogg and Smelterville. Since 1994, the milling, processing, smelting and other associated facilities have been demolished as part of EPA's ROD. The Bunker Hill mine, while currently not actively mining ore, is being maintained by the mine's owner and is not prestly part of the ROD clean-up.

Soils, surface water, ground water, and air throughout the site have been contaminated by heavy metals, to varying degrees, through a combination of airborne particulate deposition (from emissions of past processing/smelting operations alluvial deposition of tailings dumped into the river by mining activity, past waste disposal practices, and contaminant migration from onsite sources. Onsite sources include the industrial complex, tailings and other waste piles, material accumulation sites, barren hillsides, and fugitive dust source areas located throughout the site. At the time of the RI/FS, other minor site contaminants included Polychlorinated Biphenyls, PCBs, and Asbestos. Remedial actions conducted since 1994 have addressed these minor contaminants and they are no longer of concern to this site,.

The Bunker Hill Mining Complex consists/consisted of:

- The mine, milling, and concentrating operations (This area is shown in Figure 1) (note: milling and concentrating operations have been demolished and no longer exist)

- A large tailings impoundment area known as the Central Impoundment Area (B). a geomembrane cover for this 200-acre tailings impoundment is currently being designed. The cover will be constructed in 1999 and 2000.

- A lead smelter (C) (demolished in 1994 to 1996)

- A phosphate fertilizer plant (D) (demolished in 1996)

- Three sulfuric acid plants (E) (demolished in 1996)

- An electrolytic zinc plant (F) (demolished in 1995 to 1996)

- Several large hazardous materials accumulation sites created throughout the site's history to store mine and mill tailings, smelter wastes, and byproducts (all since remediated)

Other major areas of the site are the Smelterville Flats floodplain located adjacent to the South Fork of the Coeur d' Alene River (SFCDR) and the surrounding hillsides. The Smelterville Flats floodplain has been contaminated by alluvial deposition of tailings. A 1.5 million cubic yard tailings removal project has been designed and is in the process of being implemented during 1997 and 1998 in fulfillment of the requirements of the ROD.

The steep, mountainous hillsides to the south of the site have been denuded of vegetation and have severely eroded over many decades. These hillsides are required by the ROD to be replanted such that contaminant transport is minimized and the hillsides are stabilized.

1.3 NATURE AND EXTENT OF SITE CONTAMINATION

Adverse environmental impacts have occurred from heavy metals and other contaminants associated with mining, milling, and mineral beneficiation and processing activities. The Site Characterization Report (SCR) listed 13 contaminants of concern based on preliminary investigations including the following:

- Antimony
- Arsenic
- Beryllium
- Cadmium
- Cobalt
- Copper
- Lead
- Mercury
- Selenium
- Silver
- Zinc
- Asbestos (since remediated during facilitiy demolition)
- Polychlorinated Biphenyls (PCBs) (since remediated during facility demolition)

The presence of contaminants at the site was traced to the following contaminant sources and source areas identified during the RI:

- Jig Tailings-In the early years of operation, mills within the site and, for a longer period, mills upstream of the site, released tailings, a waste product from the ore concentrating process, which were deposited on the valley floor. During flood events, these tailings were transported by the SFCDR, mixed with alluvium, and deposited on the flood plain. The valley floor throughout the site is currently mantled with a mixture of jig tailings, flotation tailings, and alluvium, as well as air dispersed contaminants from the Smelter Complex. The mixture is referred to as "jig tailings" for the purpose of the RI/FS. Jig tailings were identified as a source of site wide metals contamination in soil, air, surface water, and ground water.

- Flotation Tailings-Crude flotation ore concentration methods were used at the site as early as 1913. Froth flotation was the predominant method of ore concentration after approximately 1930. The byproducts of this ore concentration process are called flotation tailings. The release of tailings from the Page Mill to the Page tailings impoundment began in 1926. Flotation tailings for the Bunker Hill Mill were deposited on the valley floor until the West Mill began discharging to the Central Impoundment Area (CIA) in 1928. Uncontrolled releases of flotation tailings in upstream areas continued until as late as 1968; these tailings comprise a portion of the alluvium/tailings mixture (jig tailings) on the SFCDR Valley floor. Flotation tailings impounded in the CIA and Page Pond were recognized as sources of metals contamination in air, surface water, and ground water.

- Inflow of Contaminants at the Upstream Site Boundary-Mining and milling operations were conducted upstream of the eastern site boundary during the same period as those conducted within the site. The RI documented the degradation of surface and ground water quality upgradient of the site, and identified the influxes of metals in surface and ground water at the eastern site boundary as sources of contamination within the site.

- Air Emissions-The Lead Smelter began operations in 1917, and Zinc Plant production began in 1928. Particulate controls were employed to capture and recycle the Lead Smelter and Zinc Plant flue dusts, but sulfur dioxide emissions were not directly addressed until sulfuric acid plants were constructed in 1954 and 1965 (Zinc Plant) and 1970 (Lead Smelter). Emission controls were not consistently effective, and operational upsets occurred, in particular after the 1973 baghouse fire. Smelter Complex air emissions, including fugitive emissions, were identified as sources of lowered pH and heavy-metal concentrations in soils throughout the site, and contributed to vegetation damage and erosion on hillside slopes.

- Smelter Complex Materials and Residuals-Ores, concentrates, flue dusts, sinter and calcine (products of roasting concentrates), lead residues, slag, gypsum, other materials, and wastes were stored, transported, and occasionally spilled in and around the Smelter Complex. Material accumulations and residual materials within the complex were identified as sources of air, surface water, and ground water contamination. The Smelter Complex had the highest concentrations of contaminants of any area within the site.

- Gypsum and Slag-Gypsum generated during phosphoric acid production was disposed in three impoundments that were identified as sources of blowing dusts and inorganic nonmetal contaminants in surface and ground water. Large quantities of granulated slag were deposited in the CIA west cell. The granulated slag was produced by the zinc fuming process wherein most of the zinc was removed as zinc oxide. Small quantities of ungranulated slag were deposited adjacent to the lead smelter. The ungranulated slag was not subjected to the zinc fuming process and therefore contains a greater abundance of zinc than the granulated slag. The remaining metals in the granulated and ungranulated slag are relatively immobile in their current state due to their incorporation in a silicate matrix.

- Acid Mine Drainage-Dewatering of the Bunker Hill Mine has contributed acidic, metals-laden mine water to the east cell of the CIA. Most dewatering was curtailed in early 1991 Seepage from the east cell was identified as the largest source of metals loading to site ground water during the RI.

Full-scale smelting operations at the site ceased in 1981, although salvage efforts, including sporadic open-pot smelting, were reported in the mid-1980s. Mining and milling operations have operated at the site intermittently since 1981, but were curtailed in early 1991. Therefore, new contaminants are no longer being generated onsite with the exception of continued mine discharge. However, contaminants continue to enter ground water and surface water at the upstream site boundary. Additional contaminants will be generated onsite and will increase if dewatering of the Bunker Hill Mine is resumed or when water flows naturally from the mine. The redistribution of contaminants from existing sources by air, surface water, ground water and anthropogenic activities continues to impact onsite and offsite areas.

A description of the nature and extent of contamination by media and current contaminant transport pathways as characterized during the RI are provided in the following sections.

SOILS AND SURFICIAL MATERIALS

Soil contamination exists in most areas of the site. Contaminant concentrations in site soils are generally highest adjacent to the prior sites of the demolished Smelter Complex and Zinc Plant. Table 1 summarizes maximum soil metals concentrations exhibited within the Bunker Hill Superfund Site. Soil metals concentrations were compared with background levels established for the Coeur d'Alene Mining District by the U.S. Geological Survey (Gott and Cathral, 1980). "Threshold levels" were established as a basis for locating ore deposits.

HILLSIDES

Metal concentrations in undisturbed hillside soils throughout the site were generally elevated above the threshold levels. The highest metals concentrations in the hillside soils occurred in the uppermost few inches of soil profile; metals concentrations generally decreased sharply with depth. Table 2 summarizes average metal concentrations for all zones at zero to 1-inch depth in the Hillsides and the vicinity around the Smelter Complex area. Sources of hillside soil contaminants included historical Lead Smelter and Zinc Plant air emissions, wind-mobilization and subsequent deposition of fugitive dust from material accumulations and residuals in the Smelter Complex, and deposition of wind-blown tailings. Erosion of contaminated soils was identified as a contaminant transport mechanism during the RI and has resulted in a reduction of surface soil concentrations in some areas.

Table 1
Maximum Metal Soils Concentrations (mg/kg) by Subarea

Areas	Arsenic	Cadmium	Lead	Zinc
Hillsides[a]	300	245	14,400	16,100
Smelterville Flats	504	78.2	30,000	15,600
CIA[b]	692	51.8	7,760	23,600
Page[c]	202	38.7	4,350	4,260
Background[c]	<10	0.8	43	95

[a]Includes areas around the Smelter Complex.
[b]Includes the CIA East, Middle, and West cells.
[c]Average concentrations.
[d]Includes Lead Smelter area, Magnet Gulch/Deadwood Gulch areas, Phosphoric Acid/Fertilizer Plant areas, and Zinc Plant area.
[e]Source: Gott and Cathrall, 1980.

Table 2
Soil Average Concentrations (mg/kg) for All Zones at Zero to 1-Inch Depth

Areas	Arsenic		Cadmium		Lead		Zinc	
Hillside Zones[a] (1 to 39)	43.3	<3.0 to 207.0	10.7	4.3 to 36.0	1,376.9	122 to 15,600	456	166 to 1,100
Hillside Zones[b] (40 to 49)	117.6	46.6 to 300.0	57.8	13.0 to 181.0	5,356	1,890 to 13,700	4,055	943 to 16,100

[a]Zones 1 through 39 include areas within the Bunker Hill Site.
[B]Zones 40 through 49 include those areas around the defunct Smelter Complex.

SMELTERVILLE FLATS

Jig tailings were widely distributed on the valley floor throughout the site; these deposits contain elevated metals concentrations compared to threshold levels. The largest accumulation of jig tailings within the project area is on Smelterville Flats, where contamination ranges to depths of 3 to 7 feet, with local accumulations approaching 10 feet in thickness. Jig tailings also underlie the CIA and portions of the Page Swamps. In general, concentrations in the jig tailings are dependent on the relative quantities of tailings and alluvium in the mixture. Maximum concentrations of 504 mg/kg arsenic, 78.2 mg/kg cadmium, 30,000 mg/kg lead, and 15,600 mg/kg zinc were measured in valley floor jig tailings samples.

TAILINGS IMPOUNDMENTS

The CIA tailings impoundment contains a total of approximately 18 million cubic yards of flotation tailings. For the CIA flotation tailings, maximum measured arsenic and cadmium concentrations (692 mg/kg and 45.2 mg/kg, respectively) occurred in surficial dust samples. Maximum measured lead and zinc concentrations (7,760 mg/kg and 7,990 mg/kg, respectively) occurred in composite core samples

SLAG

Granulated slag in the CIA west cell contains highly elevated concentrations of metals. However, these metals are generally regarded as being immobile and unavailable for transport due to their incorporation in a silicate matrix, which limits leaching, and the relatively large particle size of the slag, which limits wind transport. Maximum metals concentrations measured in the granulated slag were 172 mg/kg arsenic, 51.8 mg/kg cadmium, 5,850 mg/kg lead, and 23,650 mg/kg zinc.

2 PROJECT ORGANIZATION AND TASKS TO BE PERFORMED UNDER THIS PLAN

2.1 PROJECT ORGANIZATION

CLIENT: USEPA

CH2M HILL:
Project Manager: Joan Stoupa/SEA
Field Team Leader: Deanne Fischer/BOI
Refer to Section 4 for field staff.

CONTRACTORS and SUBCONTRACTORS: Refer to Section 4.2.

2.2 DESCRIPTION OF TASKS

(Reference Section 1, "Field Activity Start-up Form," of Site Safety Notebook

Refer to project documents (i.e., work plan) for detailed task information. A health and safety risk analysis has been performed for each task and is incorporated in this plan through task-specific hazard controls and requirements for monitoring and protection. Tasks in addition to those listed below require an approved amendment to this plan before additional work begins. Refer to Section 10.2 for procedures related to tasks that do not involve hazardous waste operations and emergency response (Hazwoper).

2.2.1 HAZWOPER-REGULATED TASKS

- Surface soil sampling
- Surface floral sampling

2.2. NON-HAZWOPER-REGULATED TASKS

Under specific circumstances, the training and medical monitoring requirements of federal or state Hazwoper regulations are not applicable. It must be demonstrated that the tasks can be performed without the possibility of exposure in order to use non-Hazwoper-trained personnel. **Prior approval from the HSM is required before these tasks are conducted on regulated hazardous waste sites.**

TASK	RESTRICTIVE CONDITIONS
• Plant growth monitoring • Design and construction support and agency field trips (primarily site inspections)	No surface soil disturbance

3 HAZARD EVALUATION AND CONTROL

3.1 HEAT AND COLD STRESS (Reference CH2M HILL SOP HS-09, Heat and Cold Stress)

3.1.1 PREVENTING HEAT STRESS

- Drink 16 ounces of water before beginning work, such as in the morning or after lunch. Disposable (e.g., 4-ounce) cups and water maintained at 50° to 60°F should be available. Under severe conditions, drink 1 to 2 cups every 20 minutes, for a total of 1 to 2 gallons per day. Take regular breaks in a cool, preferably air-conditioned, area. Do not use alcohol in place of water or other nonalcoholic fluids. Decrease your intake of coffee and caffeinated soft drinks during working hours. Monitor for signs of heat stress.
- Acclimate to site work conditions by slowly increasing workloads; e.g., do not begin site work with extremely demanding activities.
- Use cooling devices, such as cooling vests, to aid natural body ventilation. The devices add weight, so their use should be balanced against efficiency.
- Use mobile showers or hose-down facilities to reduce body temperature and cool protective clothing.
- During hot weather, conduct field activities in the early morning or evening if possible.
- Provide adequate shelter to protect personnel against radiant heat (sun, flames, hot metal), which can decrease physical efficiency and increase the probability of heat stress.
- In hot weather, rotate shifts of workers.
- Maintain good hygiene standards by frequently changing clothing and by showering. Clothing should be permitted to dry during rest periods. Persons who notice skin problems should consult medical personnel.

3.1.2 SYMPTOMS AND TREATMENT OF HEAT STRESS

	Heat Syncope	Heat Rash (*miliaria rubra*, "prickly heat")	Heat Cramps	Heat Exhaustion	Heat Stroke
Signs and Symptoms	Sluggishness or fainting while standing erect or immobile in heat.	Profuse tiny raised red blister-like vesicles on affected areas, along with prickling sensations during heat exposure.	Painful spasms in muscles used during work (arms, legs, or abdomen); onset during or after work hours.	Fatigue, nausea, headache, giddiness; skin clammy and moist; complexion pale, muddy, or flushed; may faint on standing; rapid thready pulse and low blood pressure; oral temperature normal or low	Red, hot, dry skin; dizziness; confusion; rapid breathing and pulse; high oral temperature.
Treatment	Remove to cooler area. Rest lying down. Increase fluid intake. Recovery usually is prompt and complete.	Use mild drying lotions and powders, and keep skin clean for drying skin and preventing infection.	Remove to cooler area. Rest lying down. Increase fluid intake.	Remove to cooler area. Rest lying down, with head in low position. Administer fluids by mouth. Seek medical attention.	Cool rapidly by soaking in cool– but not cold– water. Call ambulance, and get medical attention immediately!

3.1.3 *HEAT-STRESS MONITORING*

For field activities part of ongoing site work activities in hot weather, the following procedures should be used to monitor the body's physiological response to heat and to estimate the work-cycle/rest-cycle when workers are performing moderate levels of work. These procedures should be considered when the ambient air temperature exceeds 70°F, the relative humidity is high(>50%), or when the workers exhibit symptoms of heat stress.

The heart rate should be measured by the radial pulse for 30 seconds, as early as possible in the resting period. The HR at the beginning of the rest period should not exceed 110 beats/minute, or 20 beats/minute above resting pulse. If the HR is higher, the next work period should be shortened by 33 percent, while the length of the rest period stays the same. If the pulse rate still exceeds 110 beats/minute at the beginning of the next rest period, the following work cycle should be further shortened by 33 percent. The procedure is continued until the rate is maintained below 110 beats/minute, or 20 beats/minute above resting pulse.

3.1.4 *PREVENTING COLD STRESS*

- Be aware of the symptoms of cold-related disorders, and ***wear proper clothing for the anticipated fieldwork.***
- Consider monitoring the work conditions and adjusting the work schedule, using guidelines developed by the U.S. Army (wind-chill index) and the National Safety Council (NSC).
- ***Wind-Chill Index.*** This measure relates the dry bulb temperature and the wind velocity. It is used only to estimate the combined effect of wind and low air temperatures on exposed skin. The wind-chill index sometimes is limited in its usefulness because the index does not take into account the body part that is exposed, the level of activity, or the amount or type of clothing worn. For those reasons, it is used only as a guideline to warn workers when they are in a situation that can cause cold-related illnesses. Used in conjunction with the NSC guidelines, the wind-chill index provides a starting point for adjusting work and warm-up schedules.
- ***NSC Guidelines for Work and Warm-Up Schedules.*** The cold-exposure limits recommended by the NSC can be used in conjunction with the wind-chill index to estimate work and warm-up schedules for fieldwork. The guidelines are not absolute; ***workers should be monitored for symptoms of cold-related illness.*** If symptoms are not observed, the work duration can be increased.
- The wind-chill index and the NSC guidelines are in the CH2M HILL *Corporate Health and Safety Program, Program and Training Manual,* SOP HS-09.

3.1.5 *SYMPTOMS AND TREATMENT OF COLD STRESS*

	Immersion (Trench) Foot	Frostbite	Hypothermia
Signs and Symptoms	Feet discolored and painful; infection and swelling present.	Blanched, white, waxy skin, but tissue resilient; tissue cold and pale.	Shivering, apathy, sleepiness; rapid drop in body temperature; glassy stare; slow pulse; slow respiration.
Treatment	Seek medical treatment immediately.	Remove victim to a warm place. Rewarm area quickly in warm–but **not** hot–water. Have victim drink warm fluids, but **not** coffee or alcohol. Do not break blisters. Elevate the injured area, and get medical attention.	Remove victim to a warm place. Have victim drink warm fluids, but **not** coffee or alcohol. Get medical attention.

3.2 PROCEDURES FOR LOCATING BURIED UTILITIES

Local Utility Mark-Out Service - None Required for this project

3.3 GENERAL PHYSICAL (SAFETY) HAZARDS AND CONTROLS

Engineering and administrative controls are to be implemented by the party in control of the site or the hazard (i.e., CH2M HILL, subcontractor, or contractor). CH2M HILL employees and subcontractors must, at a minimum, remain aware of hazards affecting them regardless of who is responsible for controlling the hazards. Specialty subcontractors are responsible for the safe operation of their equipment (e.g., drill rig, heavy equipment). CH2M HILL employees are not to operate, or assist in the operation of, any subcontractor or contractor equipment.

Hazard (Refer to SOP, or HSP Section)	Engineering Controls, Administrative Controls, and Work Practices	Soil and Floral Sampling
Flying debris/objects (HS-07)	Provide shielding and PPE; maintain distance. **Wear head protection when climbing below another staff member.**	X
Electrical	• Make certain third wire is properly grounded. Do not tamper with electrical wiring unless qualified to do so. Ground as appropriate. • Project field sites should have ground fault circuit interrupters (GFCIs) installed for all wiring, including extension cords. • Heavy equipment (e.g., drill rig) should remain at least 15 feet from overhead power line for power lines of 50 kV or less. For each 10 kV > 50, increase distance by ½ foot. • Operate and maintain equipment according to manufacturer's instructions. • Use only extension cords that are three-wire grounded. Cords passing through work areas must be covered or elevated to protect from damage. • Use only electrical tools and equipment that are either effectively grounded or double-insulated UL approved. • Properly label switches, fuses, and circuit breakers. • Remove cord from an outlet by grasping the plug, not pulling the cord. • Protect all electrical equipment, tools, switches, etc., from elements. • Avoid physical contact with power circuit. • Only qualified electricians are to install and work on electrical circuits and equipment.	X
Suspended loads	Work not permitted under suspended loads.	X
Buried utilities, drums, tanks, etc. (Section 3.3)	Locate buried utilities, drums, tanks, etc., before digging or drilling and mark location.	X
Slip, trip, fall hazards (e.g., wet/muddy surface, inadequate railing, unstable surface)	Provide slip-resistant surfaces, ropes, and/or other devices to be used. Brace and shore equipment. **Secure items on hillside when others are on the hillside below.**	X
Back injury (HS-29)	Use proper lifting techniques, or provide mechanical lifting aids.	X
Confined space entry (Section 9.0)	Space must be evaluated by qualified person. Additional controls and monitoring, training, and an approved entry permit are generally required.	Not Approved
Protruding objects	Flag visible objects.	X
Visible lightning	Stop work.	X
Stairways, ladders, and scaffolds (HS-25)	Stairways and ladders are generally required when there is a break in elevation of 19 inches or more. Keep access ways clear. Equipment must meet OSHA specifications. Document employee training.	X
Elevated work area/falls (HS-31)	Provide guardrail, safety net, floor covers, body harness, and monitoring system, where applicable. Document employee training.	
Fire prevention and control (HS-22)	• No spark sources are allowed within exclusion or decontamination zones. • Appropriate fire fighting equipment must be available on the site. • Extinguishers are to be inspected visually every month and undergo an annual maintenance check. • Post "Exit" signs over exiting doors, and post "Fire Extinguisher" signs over extinguisher locations. Keep areas near exits and extinguishers clear. Open flames are prohibited in the vicinity of flammable materials. • Combustible materials stored outside should be at least 10 feet from the building. • Unnecessary combustible materials and flammable or combustible liquids must not be allowed to accumulate. • Flammable or combustible liquids must be kept in approved containers, and must be stored in an approved storage cabinet.	X
Inadequate illumination	Site work will be performed during daylight hours whenever possible. Work conducted during hours of darkness will require enough illumination intensity "to read a newspaper without difficulty."	X

3.4 BIOLOGICAL HAZARDS AND CONTROLS

Hazard and Location	Control Measures
Snakes typically are found in underbrush and tall grassy areas.	If you encounter a snake, stay calm and look around; there may be other snakes. Turn around and walk away on the same path you used to approach the area. If a person is bitten by a snake, wash and immobilize the injured area, keeping it lower than the heart if possible. Seek medical attention immediately. **DO NOT** apply ice, cut the wound, or apply a tourniquet. Carry the victim or have him/her walk slowly if the victim must be moved. Try to identify the type of snake: note color, size, patterns, and markings.
Poison ivy, poison oak, and poison sumac typically are found in brush or wooded areas. They are more commonly found in moist areas or along the edges of wooded areas.	Become familiar with the identity of these plants. Wear protective clothing that covers exposed skin and clothes. Avoid contact with plants and the outside of protective clothing. If skin contacts a plant, wash the area with soap and water immediately. If the reaction is severe or worsens, seek medical attention.
Exposure to **bloodborne pathogens** may occur when rendering first aid or CPR, or when coming into contact with medical or other potentially infectious material, or when coming into contact with landfill waste or waste streams containing such infectious material.	Training is required before a task involving potential exposure is performed. Exposure controls and personal protective equipment (PPE) are required as specified in CH2M HILL SOP HS-36, *Bloodborne Pathogens*. Hepatitis B vaccination must be offered before the person participates in a task where exposure is a possibility.
Bees and other stinging insects may be encountered almost anywhere and may present a serious hazard, particularly to people who are allergic.	Watch for and avoid nests. Keep exposed skin to a minimum. Carry a kit if you have had allergic reactions in the past, and inform the SSC and/or the buddy. If a stinger is present, remove it carefully with tweezers. Wash and disinfect the wound, cover it, and apply ice. Watch for allergic reaction; seek medical attention if a reaction develops.

Other Potential Biological Hazards:

3.5 TICK BITES

(Reference CH2M HILL HS-03, *Tick Bites*)

Ticks typically are in wooded areas, bushes, tall grass, and brush. Ticks are black, black and red, or brown and can be up to one-quarter inch in size.

Prevention against tick bites includes avoiding tick areas; wearing tightly woven light-colored clothing with long sleeves and wearing pant legs tucked into boots or socks; spraying **only outside** of clothing with insect repellent containing permethrin or permanone, and spraying skin with DEET; and checking yourself frequently for ticks and showering as soon as possible. To prevent chemical repellents from interfering with sample analyses, exercise care while using repellents during the collection and handling of environmental samples.

If bitten by a tick, carefully remove the tick with tweezers, grasping the tick as close as possible to the point of attachment while being careful not to crush the tick. After removing the tick, wash your hands and disinfect and press the bite area. The removed tick should be saved. Report the bite to human resources personnel.

Look for symptoms of Lyme disease or Rocky Mountain spotted fever (RMSF). Lyme: a rash that looks like a bullseye with a small welt in the center. RMSF: a rash of red spots under the skin 3 to 10 days after the tick bite. In both cases, chills, fever, headache, fatigue, stiff neck, bone pain may develop. If symptoms appear, seek medical attention.

3.6 RADIOLOGICAL HAZARDS AND CONTROLS

Refer to CH2M HILL's *Corporate Health and Safety Program, Program and Training Manual*, and *Corporate Health and Safety Program, Radiation Protection Program Manual*, for standards of practice for operating in contaminated areas.

Hazards	Controls
None Known	None Required

3.7 HAZARDS POSED BY CHEMICALS BROUGHT ON THE SITE

3.7.1 HAZARD COMMUNICATION

(Reference CH2M HILL *Hazard Communication Manual* and Section 5 of the *Site Safety Notebook*)

CH2M HILL's *Hazard Communication Program Manual,* which is available from area or regional offices and from the Corporate Human Resources Department in Denver. The project manager is to request Material Safety Data Sheets (MSDSs) from the client or from the contractors and the subcontractors for chemicals to which CH2M HILL employees potentially are exposed. The SSC is to do the following:

- Give employees required site-specific HAZCOM training.
- Confirm that the inventory of chemicals brought on the site by subcontractors is available.
- Before or as the chemicals arrive on the site, obtain an MSDS for each hazardous chemical.
- Label chemical containers with the identity of the chemical and with hazard warnings, if any.

The chemical products listed below will be used on the site. Refer to Attachment 2 for MSDSs.

Chemical	Quantity	Location

3.7.2 SHIPPING AND TRANSPORTATION OF CHEMICAL PRODUCTS

(Reference CH2M HILL's *Procedures for Shipping and Transporting Dangerous Goods*)

Nearly all chemicals brought to the site are considered hazardous materials by the U.S. Department of Transportation (DOT). All staff who ship the materials or transport them by road must receive the CH2M HILL training in shipping dangerous goods. All hazardous materials that are shipped (e.g., via Federal Express) or are transported by road must be properly identified, labeled, packed, and documented by trained staff. Contact the HSM or the Equipment Coordinator for additional information.

3.8 CONTAMINANTS OF CONCERN (REFER TO PROJECT FILES FOR MORE-DETAILED CONTAMINANT INFORMATION)

Contaminant	Location and Highest[a] Concentration (ppm)	Exposure Limit[b]	IDLH[c]	Symptoms and Effects of Exposure	PIP[d] (eV)
Arsenic	SS: 35 mg/kg	0.01 mg/m^3	5 mg/m^3 Ca	Ulceration of nasal septum, respiratory irritation; dermatitis; gastrointestinal disturbances; peripheral neuropathy, hyperpigmentation	NA
Cadmium	SS: 11 mg/kg	0.005 mg/m^3	9 mg/m^3 Ca	Pulmonary edema, coughing, chest tightness/pain, headache; chills, muscle aches, nausea, vomiting, diarrhea; difficulty breathing; loss of sense of smell; emphysema; mild anemia	NA
Lead	SS: 37500 mg/kg	0.05 mg/m^3	100 mg/m^3	Weakness, lassitude; facial pallor; pal eye; weight loss, malnutrition; abdominal pain, constipation; anemia; gingival lead line; tremors; paralysis of wrist and ankles; encephalopathy; kidney disease; irritated eyes; hypotension	NA

Footnotes:

a: Specify sample-designation and media: SB (Soil Boring), A (Air), D (Drums), GW (Groundwater), L (Lagoon), TK (Tank), SS (Surface Soil), SL (Sludge), SW (Surface Water).
b: Appropriate value of PEL, REL, or TLV listed
c: IDLH = immediately dangerous to life and health (units are the same as specified "Exposure Limit" units for that contaminant); NL = No limit found in reference materials; CA = Potential occupational carcinogen
d: PIP = photoionization potential; NA = Not applicable; UK = Unknown, "Skin" = Chemical can be absorbed through intact skin.

3.9 POTENTIAL ROUTES OF EXPOSURE

DERMAL: Contact with contaminated media. This route of exposure is minimized through proper use of PPE, as specified in Section 5.	**INHALATION:** Vapors and contaminated particulates. This route of exposure is minimized through proper respiratory protection and monitoring, as specified in sections 5 and 6, respectively.	**OTHER:** Inadvertent ingestion of contaminated media. This route should not present a concern if good hygiene practices are followed (e.g., wash hands and face before eating, drinking, or smoking).

4 PERSONNEL

4.1 CH2M HILL EMPLOYEE MEDICAL SURVEILLANCE AND TRAINING

(Reference CH2M HILL SOP HS-01, *Medical Surveillance*, and HS-02, *Health and Safety Training*)

The employees listed below are enrolled in the CH2M HILL Comprehensive Health and Safety Program and meet state and federal hazardous waste operations requirements for 40-hour initial training, 3-day on-the-job experience, and 8-hour annual refresher training. Employees designated "SSC" have received 8 hours of supervisor and instrument training and can serve as site safety coordinator (SSC) for the level of protection indicated. An SSC with a level designation (D, C, B) equal to or greater than the level of protection being used must be present during all tasks performed in exclusion or decontamination zones that involve the potential for exposure to health and safety hazards. Employees designated "FA-CPR" are currently certified by the American Red Cross, or equivalent, in first aid and CPR. At least one FA-CPR designated employee must be present during all tasks performed in exclusion or decontamination zones that involve the potential for exposure to health and safety hazards. The employees listed below are currently active in a medical surveillance program that meets state and federal regulatory requirements for hazardous waste operations. Certain tasks (e.g., confined-space entry) and contaminants (e.g., lead) may require additional training and medical monitoring.

Pregnant employees are to be informed of and are to follow the procedures in CH2M HILL's SOP HS-04, *Reproduction Protection*, including
obtaining a physician's statement of the employee's ability to perform hazardous activities, before being assigned fieldwork.

Employee Name	Office	Responsibility	SSC/FA-CPR
Doug Navetski	SEA	Site Safety Coordinator	Level D SSC; FA-CPR
Deanne Fischer	BOI	Field Team Leader	Level D SSC; needs FA-CPR
Chris Brueske	SEA	Field Team Member	Level C SSC; FA-CPR
Greg Warren	BOI	Field Team Member	Level D SSC; needs FA-CPR
Denny Mengel	BOI	alt. Field Team Member	FA-CPR
Bill Hudson		alt. Field Team Member	FA-CPR
Jim Crawford	SEA	alt. Field Team Member	Level C SSC; FA-CPR
Tim White	SEA	Other Field Work	No work in exclusion zones
Mark Bransom	PDX	Other Field Work	No work in exclusion zones
Hans Ehlert	SEA	Other Field Work	No work in exclusion zones
Dave Whitaker	PDX	Other Field Work	No work in exclusion zones
Donna Pacanovsky	SEA	Other Field Work	No work in exclusion zones
John Rogers	SEA	Other Field Work	No work in exclusion zones
Joan Stoupa	SEA	Other Field Work	No work in exclusion zones
Karen Dawson	SEA	Other Field Work	No work in exclusion zones
Rich Farrell	SEA	Other Field Work	
Shelley Sundgren	SEA	Other Field Work	
Randy Whitman	SEA	Other Field Work	

4.2 FIELD TEAM CHAIN OF COMMAND AND COMMUNICATION PROCEDURES

4.2.1 CLIENT

Contact Name: Cami Grandinetti
Phone: (206) 553-8696
Facility Contact Name:
Phone:

4.2.2 CH2M HILL

Project Manager: Joan Stoupa/SEA
Health and Safety Manager: Jim Bushnell/SEA
Field Team Leader: Deanne Fischer/BOI
Site Safety Coordinator: Doug Navetski/SEA

The SSC is responsible for contacting the field team leader and the project manager. In general, the project manager either will contact or will identify the client contact. The Health and Safety Manager (HSM) should be contacted as appropriate. The SSC or the project manager must notify the client and the HSM when a serious injury or a death occurs or when health and safety inspections by OSHA or other agencies are conducted. Refer to sections 10 through 12 for emergency procedures and phone numbers.

5 PERSONAL PROTECTIVE EQUIPMENT (PPE)

(Reference CH2M HILL SOP HS-07, *Personal Protective Equipment*, HS-08, *Respiratory Protection*, Section 2 of the *Site Safety Notebook*)

5.1 PPE SPECIFICATIONS

Task	Level	Body	Head	Respirator [b]
General work uniform when no chemical exposure is anticipated	D	Work clothes; steel-toe, steel-shank leather work boots; work gloves	Hardhat[c] Safety glasses **Optional: Sun Screen, Full Brim Hardhat**	None required
Work uniform when the first action level of 0.25 mg/m[3] is exceeded in work area as described in Section 6.	Modified D	**COVERALLS:** Uncoated Tyvek® **BOOTS:** Steel-toe, steel-shank chemical-resistant boots OR steel-toe, steel-shank leather work boots **GLOVES:** Inner surgical-style nitrile glove AND outer chemical-resistant nitrile glove.	Hardhat[c] Safety glasses **Optional: Sun Screen, Full Brim Hardhat**	None required
Work uniform when the second action level of 0.5 mg/m[3] is exceeded in the breathing zone as described in Section 6.	C	**COVERALLS:** Uncoated Tyvek® **BOOTS:** Steel-toe, steel-shank chemical-resistant boots OR steel-toe, steel-shank leather work boots with outer rubber boot covers **GLOVES:** Inner surgical-style nitrile glove AND outer chemical-resistant nitrile glove.	Hardhat[c] Safety glasses **Optional: Sun Screen, Full Brim Hardhat** Spectacle inserts	APR, full face, MSA Ultratwin or equivalent; with GME-H[e] cartridges or equivalent

[a] Modifications are as indicated. CH2M HILL will provide PPE to only CH2M HILL employees.
[b] No facial hair that would interfere with respirator fit is permitted.
[c] Hardhat and splash-shield areas are to determined by the SSC.
[d] Ear protection should be worn while working around drill rigs or other noise-producing equipment or when conversations cannot be held at distances of 3 feet or less without shouting. Refer to Section 6 for other requirements.
[e] The GME-H cartridge is the new standard-issue cartridge. Available stock of the previously standard GMC-H cartridges may be used for tasks covered by this plan.

5.2 REASONS FOR UPGRADING OR DOWNGRADING LEVEL OF PROTECTION

Upgrade *	Downgrade
• Request from individual performing task. • Change in work task that will increase contact or potential contact with hazardous materials. • Occurrence or likely occurrence of gas or vapor emission. • Known or suspected presence of dermal hazards. • Instrument action levels (Section 6) exceeded.	• New information indicating that situation is less hazardous than originally thought. • Change in site conditions that decreases the hazard. • Change in work task that will reduce contact with hazardous materials.

* Performing a task that requires an upgrade to a higher level of protection (e.g., level D to level C) is permitted only when the PPE requirements have been specified in Section 5 and an SSC who meets the requirements specified in subsection 4.1 is present.

6 AIR MONITORING SPECIFICATIONS

(Reference CH2M HILL SOP HS-06, *Air Monitoring*, and Section 2 of the *Site Safety Notebook*)
The air monitoring specification breaks the work area into 2 zones. The zones are based on the levels of lead in the soils and are related to the proximity to the former zinc plant and stack. The areas of high contamination include the lower slopes of government gulch. The higher slopes of government gulch have much lower concentrations of lead contamination. The following table reflects the difference in contamination and sets 2 action levels for total dust depending on the location where the samples are being collected.

The referenced polygon areas are shown in Figure 1.

The first zone has high levels of contamination and includes the lower section of sampling Polygon No. 20 below staging area No. 5 and polygons 17 and 18 on the government gulch side of polygon 20. Sampling polygon No. 3 and the lower half of polygon No. 6 are also included in the first zone.

The second zone includes all other polygons.

Zone 1 Monitoring Specification

Includes Polygon 3, the lower half of polygon 6, and the portion of polygon 20 below polygons 17 and 18

Instrument	Tasks	Action Levels[a,b]		Frequency [c]	Calibration
Dust Monitor: Miniram model PDM-3 or equivalent	Surface Soil Sampling Floral Sampling All	≤ 0.25 mg/m³ 0.25 - 0.5 mg/m³ ≥ 0.5 mg/m³ ≥ 5.0 mg/m³	Level D Modified Level D Level C Stop Work Contact HSM	Initially and periodically during task	Zero Daily
Zone 2 Monitoring Specification **Includes all other areas outside zone 1 described above**					
Visual Observation:	Surface Soil Sampling Floral Sampling All	When there is visible dust in the work area conduct miniram monitoring.		Continuous during advancement of boring or trench	N/A
Dust Monitor: Miniram model PDM-3 or equivalent	Surface Soil Sampling Floral Sampling All	< 2.5 mg/m³ ≥ 2.5 mg/m³	Level D Level C	Initially and periodically during task	Zero Daily

Note a: Action levels apply to sustained work area measurements above background.
Note b: Action levels apply to sustained breathing-zone measurements above background.
Note c: The exact frequency of monitoring depends on field conditions and is to be determined by the SSC; generally, every 5 to 15 minutes is acceptable; more frequently may be appropriate. Monitoring results should be recorded. Documentation should include instrument and calibration information, time and measurement result, personnel monitored, and place/location where measurement is taken (e.g., "Breathing Zone/MW-3," "at surface/SB-2," etc.).

6.1 CALIBRATION SPECIFICATIONS

(Refer to the respective manufacturer's instructions for proper instrument-maintenance procedures)

Instrument	Gas	Span	Reading	Method
Dust Monitor: Miniram-PDM3	Dust-free air	Not applicable	0.00 mg/m^3 in "Measure" mode	Dust-free area OR Z-bag with HEPA filter

6.2 AIR SAMPLING

Sampling may be required by other OSHA regulations where there may be exposure to certain contaminants. Air sampling typically is required when site contaminants include lead, cadmium, arsenic, asbestos, and certain volatile organic compounds. Contact the HSM immediately if these contaminants are encountered.

Method Description:

No air sampling is anticipated.

Personnel and Areas

Results must be sent immediately to the HSM. Regulations may require reporting to monitored personnel. Results reported to:

HSM:
Other:

7 DECONTAMINATION

(REFERENCE CH2M HILL SOP HS-13, *DECONTAMINATION*)

The SSC must monitor the effectiveness of the decontamination procedures. Decontamination procedures found to be ineffective will be modified by the SSC.

7.1 DECONTAMINATION SPECIFICATIONS

Personnel

- Boot wash/rinse
- Glove wash/rinse
- Outer-glove removal
- Body-suit removal
- Inner-glove removal
- Respirator removal
- Hand wash/rinse
- Face wash/rinse
- Shower ASAP
- **PPE-disposal method:**

Dispose of all PPE in designated receptacles in the MK office area.

- **Water-disposal method:**

Dry personnel decontamination methods will be used

Sample Equipment

- Wash/rinse equipment
- Solvent-rinse equipment
- **Solvent-disposal method:**

Any water used to wash down sampling equipment will be allowed to soak into the ground

Heavy Equipment

- Power wash
- Steam clean
- **Water-disposal method:**

Vehicles will be decontaminated at the decon stations provided

7.2 DIAGRAM OF PERSONNEL-DECONTAMINATION LINE

No eating, drinking, or smoking is permitted in contaminated areas and in exclusion or decontamination zones. The SSC should establish areas for eating, drinking, and smoking. Contact lenses are not permitted in exclusion or decontamination zones.

Figure 7-1 illustrates a typical establishment of work zones, including the decontamination line. Work zones are to be modified by the SSC to accommodate task-specific requirements.

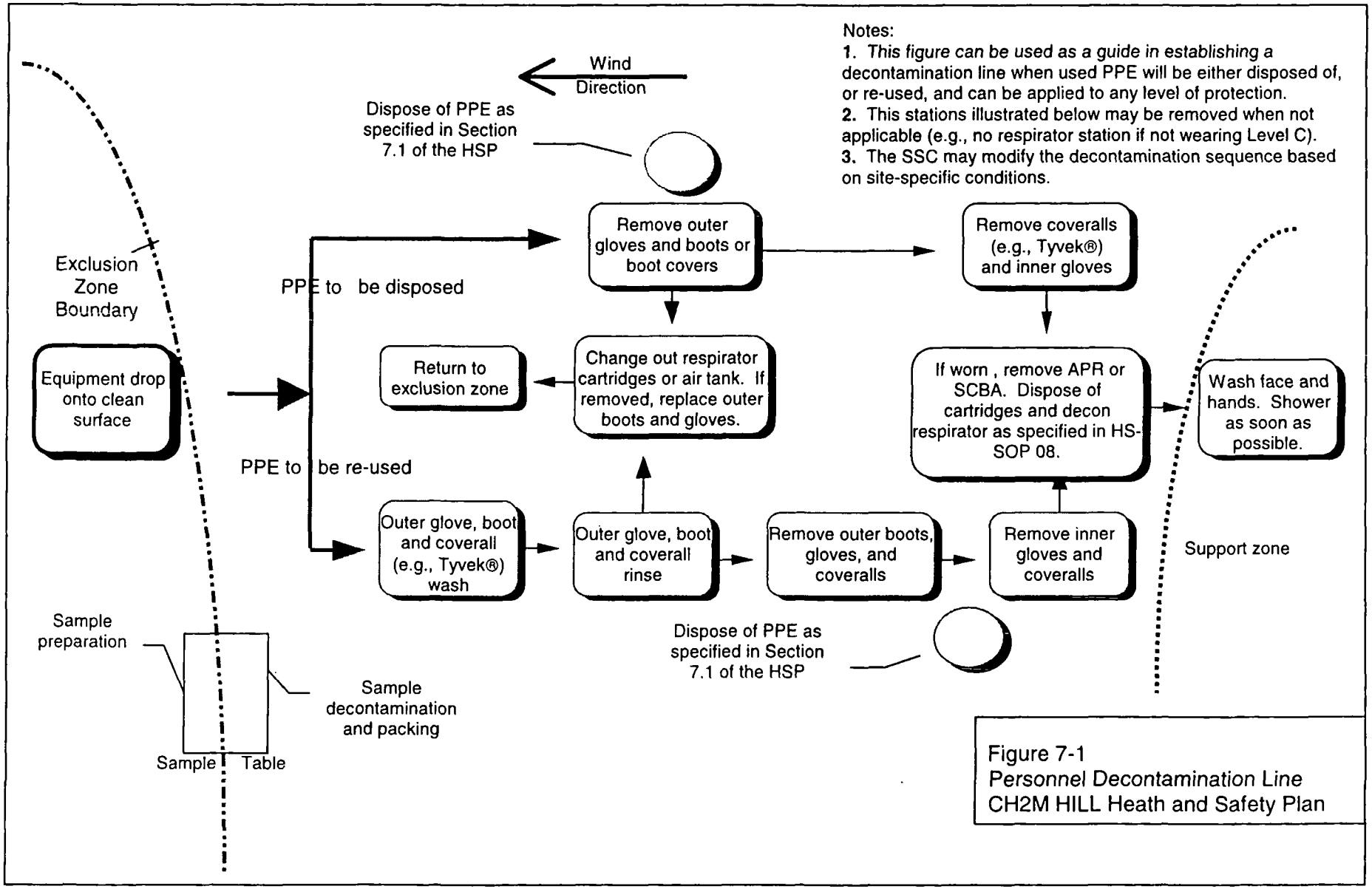


Figure 7-1
Personnel Decontamination Line
CH2M HILL Heath and Safety Plan

8 SPILL-CONTAINMENT PROCEDURES

Sorbent material will be maintained in the support zone. Incidental spills will be contained with sorbent and will be disposed of properly.

9 CONFINED-SPACE ENTRY

(Reference CH2M HILL SOP HS-17, *Confined Space Entry*)

No confined-space entry will be permitted. Confined-space entry requires additional health and safety procedures, training, and a permit. If conditions change such that confined-space entry is necessary, contact the HSM to develop the required entry permit.

When planned activities will not include confined-space entry, permit-required confined spaces accessible to CH2M HILL personnel are to be identified before the task begins. The SSC is to confirm that permit spaces are properly posted or that employees are informed of their locations and informed of their hazards.

10 SITE-CONTROL PLAN

10.1 SITE-CONTROL PROCEDURES

- The site safety coordinator (SSC) will conduct a site safety briefing (see below) before starting field activities or as tasks and site conditions change.
- Topics for briefing on site safety: general discussion of health and safety plan, site-specific hazards, locations of work zones, PPE requirements, equipment, special procedures, emergencies. Refer to Section 8 of *Site Safety Notebook*.
- The SSC records attendance at safety briefings in a logbook and documents the topics discussed.
- The SSC completes the H&S Self Assessment included in Appendix 3 weekly and forwards the completed assessment to the HSM.
- Post the OSHA job-site poster in a central and conspicuous location at sites where project field offices, trailers, or equipment storage boxes are established. Posters can be obtained by calling either 800/548-4776 or 800/999-9111.
- Field Trailers: Post "Exit" signs above exit doors, and post "Fire Extinguisher" signs above locations of extinguishers. Keep areas near exits and extinguishers clear.
- Determine wind direction.
- Establish work zones: support, decontamination, and exclusion zones. Delineate work zones with flags or cones as appropriate. Support zone should be upwind of the site.
- Establish decontamination procedures, including respirator-decontamination procedures, and test the procedures.
- Use access control at the entry and exit from each work zone.
- Store chemicals in appropriate containers.
- Make MSDSs available for onsite chemicals to which employees are exposed.
- Establish onsite communication consisting of the following:
  - Line-of-sight and hand signals
  - Air horn
  - Two-way radio or cellular telephone if available
- Establish offsite communication.
- Establish and maintain the "buddy system."
- Establish procedures for disposing of material generated on the site.
- Initial air monitoring is conducted by the SSC in appropriate level of protection.
- The SSC is to conduct periodic inspections of work practices to determine the effectiveness of this plan -- refer to CH2M HILL SOP 18, *Health and Safety* Checklist, or Section 4 of *Site Safety Notebook*. Deficiencies are to be noted, reported to the HSM, and corrected.

10.2 HAZWOPER Compliance PLAN

(Reference CH2M HILL SOP HS-17, *Health and Safety Plans*)

This section outlines procedures to be followed when certain activities do not require 24- or 40-hour training. ***Note, prior approval from the HSM is required before these tasks are conducted on regulated hazardous waste sites.***

- Certain parts of the site work may be covered by state or federal Hazwoper standards and therefore require training and medical monitoring. Anticipated tasks must be included in subsection 2.2.1.
- Air sampling must confirm that there is no exposure to gases or vapors before non-Hazwoper-trained personnel are allowed on the site. Other data (e.g., soil) also must document that there is no potential for exposure. The HSM must approve the interpretation of these data. Refer to subsections 3.8 and 6.2 for contaminant data and air sampling requirements, respectively.
- Non-Hazwoper-trained personnel must be informed of the nature of the existing contamination and its locations, the limits of their access, and the emergency action plan for the site. Non-Hazwoper-trained personnel also must be trained in accordance with all other state and federal OSHA requirements, including 29 CFR 1910.1200 (HAZCOM). Refer to subsection 3.7.1 for hazard communication requirements.
- Air monitoring with direct-reading instruments conducted during regulated tasks also should be used to ensure that non-Hazwoper-trained personnel (e.g., in an adjacent area) are not exposed to volatile contaminants. Non-Hazwoper-trained personnel should be monitored whenever the belief is that there may be a possibility of exposure (e.g., change in site conditions), or at some reasonable frequency to confirm that there is no exposure. Refer to Section 6.1 for air monitoring requirements.
- Treatment system start-ups: Once a treatment system begins to pump and treat contaminated media, the site is, for the purposes of applying the Hazwoper standard, considered a treatment, storage, and disposal facility (TSDF). Therefore, once the system begins operation, only Hazwoper-trained personnel (minimum of 24 hours of training) will be permitted to enter the site. All non-Hazwoper-trained personnel must leave the site.

If Hazwoper-regulated tasks are conducted concurrently with nonregulated tasks, non-Hazwoper-trained subcontractors must be removed from areas of exposure. If non-Hazwoper-trained personnel remain on the site while a Hazwoper-regulated task is conducted, the contaminant/exposure area (exclusion zone) must be posted, non-Hazwoper-trained personnel must be reminded of the locations of restricted areas and the limits of their access, and real-time monitoring must be conducted. Non-Hazwoper-trained personnel at risk of exposure must be removed from the site until it can be demonstrated that there is no longer a potential for exposure to health and safety hazards.

11 RESPONSE PLAN (REFERENCE CH2M HILL SOP HS-12, EMERGENCY RESPONSE)

11.1 PRE-EMERGENCY PLANNING

The SSC performs the applicable pre-emergency planning tasks before starting field activities and coordinates emergency response with the facility and local emergency-service providers as appropriate.

- Review the facility emergency and contingency plans where applicable.
- Locate the nearest telephone; determine what onsite communication equipment is available (e.g., two-way radio, air horn).
- Identify and communicate chemical, safety, radiological, and biological hazards.
- Confirm and post emergency telephone numbers, evacuation routes, assembly areas, and route to hospital; communicate the information to onsite personnel.
- Post site map marked with locations of emergency equipment and supplies, and post OSHA job-site poster. The OSHA job-site poster is required at sites where project field offices, trailers, or equipment-storage boxes are established. Posters can be obtained by calling either 800/548-4776 or 800/999-9111.
- Field Trailers: Post "Exit" signs above exit doors, and post "Fire Extinguisher" signs above locations of extinguishers. Keep areas near exits and extinguishers clear.
- Review changed site conditions, onsite operations, and personnel availability in relation to emergency response procedures.
- Evaluate capabilities of local response teams where applicable.
- Where appropriate and acceptable to the client, inform emergency room and ambulance and emergency response teams of anticipated types of site emergencies.
- Designate one vehicle as the emergency vehicle; place hospital directions and map inside; keep keys in ignition during field activities.
- Inventory and check site emergency equipment, supplies, and potable water.
- Communicate emergency procedures for personnel injury, exposures, fires, explosions, chemical and vapor releases.
- Review notification procedures for contacting CH2M HILL's medical consultant and team member's occupational physician.
- Rehearse the emergency response plan once before site activities begin, including driving the route to the hospital.
- Brief new workers on the emergency response plan.

The SSC will evaluate emergency response actions and initiate appropriate follow-up actions.11.2 EMERGENCY EQUIPMENT AND SUPPLIES

The SSC should mark the locations of emergency equipment on the site map and should post the map.

Emergency Equipment and Supplies	Location
Fire extinguisher (A, B, and C classes)	In Field Vehicle
First aid kit	In Field Vehicle
Eye wash	In Field Vehicle
Potable water	In Field Vehicle and with sampling crew
Bloodborne-pathogen kit	In Field Vehicle
Cellular Phone	In Field Vehicle
Additional equipment (specify)	Chemical ice packs to cool employees who develop signs of heat stress

11.3 EMERGENCY MEDICAL TREATMENT

- Notify appropriate emergency response authorities listed in sections 12 and 13 (e.g., 911).
- During a time of no emergency, contact CH2M HILL's medical consultant for advice and guidance on medical treatment.
- The SSC will assume charge during a medical emergency until the ambulance arrives or until the injured person is admitted to the emergency room.
- Prevent further injury.
- Initiate first aid and CPR where feasible.
- Get medical attention immediately.
- Perform decontamination where feasible; lifesaving and first aid or medical treatment take priority.
- Notify the field team leader and the project manager of the injury.
- Make certain that the injured person is accompanied to the emergency room.
- Notify the health and safety manager.
- Notify the injured person's human resources department within 24 hours.
- Prepare an incident report -- refer to CH2M HILL SOP 12, *Emergency Response and First Aid*, and Section 6 of *Site Safety Notebook*. Submit the report to the corporate director of health and safety and the corporate human resources department (COR) within 48 hours.
- When contacting the medical consultant, state that you are calling about a CH2M HILL matter, and give your name, your telephone number, the name of the injured person, the extent of the injury or exposure, and the name and location of the medical facility where the injured person was taken.

11. 4 NONEMERGENCY PROCEDURES

The procedures listed above may be applied to nonemergency incidents. Injuries and illnesses (including overexposure to contaminants) must be reported to Human Resources. If there is doubt about whether medical treatment is necessary, or if the injured person is reluctant to accept medical treatment, contact the CH2M HILL medical consultant.

- When contacting the medical consultant, state that the situation is a CH2M HILL matter, and give your name, your telephone number, the name of the injured person, the extent of the injury or exposure, and the name and location of the medical facility where the injured person was taken.
- Follow these procedures as appropriate.

11.5 INCIDENT RESPONSE

In fires, explosions, or chemical releases, actions to be taken include the following:

- Shut down CH2M HILL operations and evacuate the immediate work area.
- Account for personnel at the designated assembly area(s).
- Notify appropriate response personnel.
- Assess the need for site evacuation, and evacuate the site as warranted.

Instead of implementing a work-area evacuation, note that small fires or spills posing minimal safety or health hazards may be controlled.

11.6 EVACUATION

- Evacuation routes will be designated by the SSC before work begins.
- Onsite and offsite assembly points will be designated before work begins.
- Personnel will leave the exclusion zone and assemble at the onsite assembly point upon hearing the emergency signal for evacuation.
- Personnel will assemble at the offsite point upon hearing the emergency signal for a site evacuation.
- The SSC and a "buddy" will remain on the site after the site has been evacuated (if possible) to assist local responders and advise them of the nature and location of the incident.
- The SSC accounts for all personnel in the onsite assembly zone.
- A person designated by the SSC before work begins will account for personnel at the offsite assembly area.
- The SSC will write up the incident as soon as possible after it occurs and will submit a report to the corporate director of health and safety.

11.7 EVACUATION ROUTES AND ASSEMBLY POINTS

Refer to the site map in Section 1. Evacuation routes and assembly areas (and alternative routes and assembly areas) are specified on the site map.

11.8 EVACUATION SIGNALS

Signal	Meaning
Grasping throat with hand	Emergency–help me.
Thumbs up	OK; understood.
Grasping buddy's wrist	Leave area now.
Continuous sounding of horn	Emergency; leave site now.

Client/Facility:

12 EMERGENCY RESPONSE

12.1 EMERGENCY RESPONSE TELEPHONE NUMBERS

SITE ADDRESS:	**Phone:** **Cellular Phone:**
Police:	**Phone:** 911 * (verify) 208/753-3000
Fire:	**Phone:** 911 * (verify) 208/784-1188 (Kellogg) 208/752-1123 (Wallace)
Ambulance:	**Phone:** 911 * (verify) 208/784-1188
Water:	**Phone:**
Gas:	**Phone:**
Electric:	**Phone:**

* When using a cellular phone outside the telephone's normal calling area, exercise caution in relying on the cellular phone to activate 911. When the caller is outside the normal calling area, the cellular service carrier should connect the caller with emergency services in the area where the call originated, but this may not occur. Telephone numbers of backup emergency services should be provided if a cellular phone is relied on to activate 911.

Hospital:	Shoshone Medical Center	**Phone:** 784-1221
Address:	Jacobs Gulch Kellogg, Idaho	

Route to Hospital: (Refer to Figure 12-1)

12.2 GOVERNMENT AGENCIES INVOLVED IN PROJECT

Federal Agency and Contact Name: Cami Grandinetti
Phone: 206/553-8696

State Agency and Contact Name:
Phone:

Contact the project manager. Generally, the project manager will contact relevant government agencies.

THIS PAGE IS RESERVED FOR MAP OF ROUTE TO HOSPITAL

FIGURE 12-1

Also, the next page contains the emergency contact numbers. The contacts that have been filled in refer to the corporate level of contacts. Word processing centers should request that someone (i.e., SPA, HR, other staff that prepare plans) in their office fill in the region/office-specific blanks (e.g., regional manager, etc.) located in Section 13 of the HSP template. The region-specific file can then be maintained as the template, further reducing redundant efforts in staff preparing a HSP.

13 EMERGENCY CONTACTS

If an injury occurs, notify the injured person's personnel office as soon as possible after obtaining medical attention for the injured person. Notification MUST be made within 24 hours of the injury.

CH2M HILL Medical Consultant

Dr. Elayne F. Theriault
Environmental Medical Resources, Inc.
Atlanta, Georgia
800/229-3674 OR 770/455-0818
(After-hours calls will be returned within 20 minutes.)

Occupational Physician (Regional or Local)

North Side Medical Center
North 9222 Newport Highway
Suite #1
Spokane, WA 99218
Contact: Julie Alberts
509-467-4545

Corporate Director Health and Safety

Name: Mollie Netherland/SEA
Phone: 425/453-5000 ext. 5342

Site Safety Coordinator (SSC)

Name: Doug Navetski/SEA
Phone: 425/453-5000

Medical and Training Manager

Name: Cyndi Carel/COR-SEA
Phone: 425/453-5000 ext. 5117

Regional Manager

Name: Mike Kennedy/SEA
Phone: 425/453-5000

Health and Safety Manager (HSM)

Name: Jim Bushnell/SEA
Phone: 425/453-5000

Project Manager

Name: Joan Stoupa/SEA
Phone: 425/453-5000

Radiation Health Manager (RHM)

Name: Dave McCormack/SEA
Phone: 425/453-5000 ext. 5417

Regional Human Resources Department

Name: Jim Powell/SAC
Phone: 916/920-0212 ext. 221

Client USEPA
Name: Cami Grandinetti
Phone:206/553-8696

Corporate Human Resources Department

Name: Julie Zimmerman/COR
Phone: 303/771-0900

Federal Express Dangerous Goods Shipping
Phone: 800/238-5355

CH2M HILL Emergency Number for Shipping Dangerous Goods
Phone: 800/255-3924

Worker's Compensation and Auto Claims

GAB Business Services, Inc.
Phone: 800/747-7222 After hours 800/621-5410

Report fatalities AND report vehicular accidents involving pedestrians, motorcycles, or more than two cars.

14 APPROVAL

This site-specific health and safety plan has been written for use by CH2M HILL only. CH2M HILL claims no responsibility for its use by others unless that use has been specified and defined in project or contract documents. The plan is written for the specific site conditions, purposes, dates, and personnel specified and must be amended if those conditions change.

14.1 ORIGINAL PLAN

WRITTEN BY: M. Netherland **DATE:** June 30, 1994

APPROVED BY: Bob Nash, CIH **DATE:** July 8, 1994

Reviewed By:

14.2 REVISIONS

REVISIONS MADE BY: Jim Bushnell **DATE:** 4/27/98

REVISIONS APPROVED BY: Jim Bushnell, CIH, CSP **DATE:** 5/6/98

15 DISTRIBUTION

Name	Office	Responsibility	Number of Copies
Jim Bushnell	SEA	Health and Safety Manager/Approver	1
Joan Stoupa	SEA	Project Manager	1
Tim White	SEA	Technical Lead	1
Deanne Fischer	BOI	Field Team Leader/Field Team	1
Doug Navetski	SEA	Site Safety Coordinator	1
Cami Grandinetti	EPA	Client Project manager	

16 ATTACHMENTS

Attachment 1: Employee Signoff
Attachment 2: Applicable Material Safety Data Sheet
Attachment 2: H&S Self Assessment Forms

Attachment 1
Employee Signoff

EMPLOYEE SIGNOFF

The employees listed below have been given a copy of this health and safety plan, have read and understood it, and agree to abide by its provisions.

EMPLOYEE NAME	EMPLOYEE SIGNATURE AND DATE

Attachment 2
Material Safety Data Sheets

- No hazardous chemicals will be used initially, MDSDs will be provided if any hazardous chemicals are brought on site.
- "Substance Data Sheet for Occupational Exposure to
- Lead" and "Employee Standard Summary for Lead

1910.1025 (l) Employee information and training -

(1) Training program.

(i) Each employer who has a workplace in which there is a potential exposure to airborne lead at any level shall inform employees of the content of Appendices A and B of this regulation.

(ii) The employer shall institute a training program for and assure the participation of all employees who are subject to exposure to lead at or above the action level or for whom the possibility of skin or eye irritation exists.

(iii) The employer shall provide initial training by 180 days from the effective date for those employees covered by paragraph (l)(1)(ii) on the standard's effective date and prior to the time of initial job assignment for those employees subsequently covered by this paragraph.

(iv) The training program shall be repeated at least annually for each employee.

(v) The employer shall assure that each employee is informed of the following:

(A) The content of this standard and its appendices;

(B) The specific nature of the operations which could result in exposure to lead above the action level;

(C) The purpose, proper selection, fitting, use, and limitations of respirators;

(D) The purpose and a description of the medical surveillance program, and the medical removal protection program including information concerning the adverse health effects associated with excessive exposure to lead (with particular attention to the adverse reproductive effects on both males and females);

(E) The engineering controls and work practices associated with the employee's job assignment;

(F) The contents of any compliance plan in effect; and

(G) Instructions to employees that chelating agents should not routinely be used to remove lead from their bodies and should not be used at all except under the direction of a licensed physician;

(2) Access to information and training materials.

(i) The employer shall make readily available to all affected employees a copy of this standard and its appendices.

(ii) The employer shall provide, upon request, all materials relating to the employee information and training program to the Assistant Secretary and the Director.

(iii) In addition to the information required by paragraph (l)(1)(v), the employer shall include as part of the training program, and shall distribute to employees, any materials pertaining to the Occupational Safety and Health Act, the regulations issued pursuant to that Act, and this lead standard, which are made available to the employer by the Assistant Secretary.

1910.1025 App A Substance data sheet for occupational exposure to lead
I. SUBSTANCE IDENTIFICATION

A. Substance: Pure lead (Pb) is a heavy metal at room temperature and pressure and is a basic chemical element. It can combine with various other substances to form numerous lead compounds.
B. Compounds Covered by the Standard: The word "lead" when used in this standard means elemental lead, all inorganic lead compounds and a class of organic lead compounds called lead soaps. This standard does not apply to other organic lead compounds.
C. Uses: Exposure to lead occurs in at least 120 different occupations, including primary and secondary lead smelting, lead storage battery manufacturing, lead pigment manufacturing and use, solder manufacturing and use, shipbuilding and ship repairing, auto manufacturing, and printing.
D. Permissible Exposure: The Permissible Exposure Limit (PEL) set by the standard is 50 micrograms of lead per cubic meter of air (50 ug/m(3)), averaged over an 8-hour workday.
E. Action Level: The standard establishes an action level of 30 micrograms per cubic meter of air (30 ug/m(3)), time weighted average, based on an 8-hour work-day. The action level initiates several requirements of the standard, such as exposure monitoring, medical
surveillance, and training and education.

II. HEALTH HAZARD DATA

A. Ways in which lead enters your body. When absorbed into your body in certain doses lead is a toxic substance. The object of the lead standard is to prevent absorption of harmful quantities of lead. The standard is intended to protect you not only from the immediate toxic effects of lead, but also from the serious toxic effects that may not become apparent untilyears of exposure have passed.

Lead can be absorbed into your body by inhalation (breathing) and ingestion (eating). Lead (except for certain organic lead compounds not covered by the standard, such as tetraethyl lead) is not absorbed through your skin. When lead is scattered in the air as a dust, fume or mist it can be inhaled and absorbed through you lungs and upper respiratory tract. Inhalation of airborne lead is generally the most important source of occupational lead absorption. You can also absorb lead through your digestive system if lead gets into your mouth and is swallowed. If you handle food, cigarettes, chewing tobacco, or make-up which have lead on them or handle them with hands contaminated with lead, this will contribute to ingestion.

A significant portion of the lead that you inhale or ingest gets into your blood stream. Once in your blood stream, lead is circulated throughout your body and stored in various organs and body tissues. Some of this lead is quickly filtered out of your body and excreted, but some remains in the blood and other tissues. As exposure to lead continues, the amount stored in your body will increase if you are absorbing more lead than your body is excreting. Even though you may not be aware of any immediate symptoms of disease, this lead stored in your tissues can be slowly causing irreversible damage, first to individual cells, then to your organs and whole body systems.

B. Effects of overexposure to lead - (1) Short term (acute) overexposure. Lead is a potent, systemic poison that serves no known useful function once absorbed by your body. Taken in large enough doses, lead can kill you in a matter of days. A condition affecting the brain called acute encephalopathy may arise which develops quickly to seizures, coma, and death from cardiorespiratory arrest. A short term dose of lead can lead to acute encephalopathy. Short term occupational exposures of this magnitude are highly unusual, but not impossible. Similar forms of encephalopathy may, however, arise from extended, chronic exposure to lower doses of lead. There is no sharp dividing line between rapidly developing acute effects of lead, and chronic effects which take longer to acquire. Lead adversely affects numerous body systems, and causes forms of health impairment and disease which arise after periods of exposure as short as days or as long as several years.

(2) Long-term (chronic) overexposure. Chronic overexposure to lead may result in severe damage to your blood-forming, nervous, urinary and reproductive systems. Some common symptoms of chronic overexposure include loss of appetite, metallic taste in the mouth, anxiety, constipation, nausea, pallor, excessive tiredness, weakness, insomnia, headache, nervous irritability, muscle and joint pain or soreness, fine tremors, numbness, dizziness, hyperactivity and colic. In lead colic there may be severe abdominal pain.

Damage to the central nervous system in general and the brain (encephalopathy) in particular is one of the most severe forms of lead poisoning. The most severe, often fatal, form of encephalopathy may be preceded by vomiting, a feeling of dullness progressing to drowsiness and stupor, poor memory, restlessness, irritability, tremor, and convulsions. It may arise suddenly with the onset of seizures, followed by coma, and death. There is a tendency for muscular weakness to develop at the same time. This weakness may progress to paralysis often observed as a characteristic "wrist drop" or "foot drop" and is a manifestation of a disease to the nervous system called peripheral neuropathy.

Chronic overexposure to lead also results in kidney disease with few, if any, symptoms appearing until extensive and most likely permanent kidney damage has occurred. Routine laboratory tests reveal the presence of this kidney disease only after about two-thirds of kidney function is lost. When overt symptoms of urinary dysfunction arise, it is often too late to correct or prevent worsening conditions, and progression to kidneydialysis or death is possible.

Chronic overexposure to lead impairs the reproductive systems of both men and women. Overexposure to lead may result in decreased sex drive, impotence and sterility in men. Lead can alter the structure of sperm cells raising the risk of birth defects. There is evidence of miscarriage and stillbirth in women whose husbands were exposed to lead or who were exposed to lead themselves. Lead exposure also may result in decreased fertility, and abnormal menstrual cycles in women. The course of pregnancy may be adversely affected by exposure to lead since lead crosses the placental barrier and poses risks to developing fetuses. Children born of parents either one of whom were exposed to excess lead levels are more likely to have birth defects, mental retardation, behavioral disorders or die during the first year of childhood.

Overexposure to lead also disrupts the blood-forming system resulting in decreased hemoglobin (the substance in the blood that carries oxygen to the cells) and ultimately anemia. Anemia is characterized by weakness, pallor and fatigability as a result of decreased oxygen carrying capacity in the blood.

(3) Health protection goals of the standard. Prevention of adverse health effects for most workers from exposure to lead throughout a working lifetime requires that worker blood lead (PbB) levels be maintained at or below forty micrograms per one hundred grams of whole blood (40 ug/100g). The blood lead levels of workers (both male and female workers) who intend to have children should be maintained below 30 ug/100g to minimize adverse reproductive health effects to the parents and to the developing fetus.

The measurement of your blood lead level is the most useful indicator of the amount of lead being absorbed by your body. Blood lead levels (PbB) are most often reported in units of milligrams (mg) or micrograms (ug) of lead (1 mg=1000 ug) per 100 grams (100g), 100 milliters (100 ml) or deciliter (dl) of blood. These three units are essentially the same. Sometime PbB's are expressed in the form of mg% or ug%. This is a shorthand notation for 100g, 100 ml, or dl.

PbB measurements show the amount of lead circulating in your blood stream, but do not give any information about the amount of lead stored in your various tissues. PbB measurements merely show current absorption of lead, not the effect that lead is having on your body or the effects that past lead exposure may have already caused. Past research into lead-related diseases, however, has focused heavily on associations between PbBs and various diseases. As a result, your PbB is an important indicator of the likelihood that you will gradually acquire a lead-related health impairment or disease.

Once your blood lead level climbs above 40 ug/100g, your risk of disease increases. There is a wide variability of individual response to lead, thus it is difficult to say that a particular PbB in a given person will cause a particular effect. Studies have associated fatal encephalopathy with PbBs as low as 150 ug/100g. Other studies have shown other forms of diseases in some workers with PbBs well below 80 ug/100g. Your PbB is a crucial indicator of the risks to your health, but one other factor is also extremely important. This factor is the length of time you have had elevated PbBs. The longer you have an elevated PbB, the greater the risk that large quantities of lead are being gradually stored in your organs and tissues (body burden). The greater your overall body burden, the greater the chances of substantial permanent damage.

The best way to prevent all forms of lead-related impairments and diseases-both short term and long term- is to maintain your PbB below 40 ug/100g. The provisions of the standard are designed with this end in mind. Your employer has prime responsibility to assure that the provisions of the standard are complied with both by the company and by individual workers. You as a worker, however, also have a responsibility to assist your employer in complying with the standard. You can play a key role in protecting your own health by learning about the lead hazards and their control, learning what the standard requires, following the standard where it governs your own actions, and seeing that your employer complies with provisions governing his actions.

(4) Reporting signs and symptoms of health problems. You should immediately notify your employer if you develop signs or symptoms associated with lead poisoning or if you desire medical advice concerning the effects of current or past exposure to lead on your ability to have a healthy child. You should also notify your employer if you have difficulty breathing during a respirator fit test or while wearing a respirator. In each of these cases your employer must make available to you appropriate medical examinations or consultations. These must be provided at no cost to you and at a reasonable time and place.

The standard contains a procedure whereby you can obtain a second opinion by a physician of your choice if the employer selected the initial physician.

1910.1025 App B •: Employee standard

This appendix summarizes key provisions of the standard that you as a worker should become familiar with.

I. PERMISSIBLE EXPOSURE LIMIT (PEL) - PARAGRAPH (C)

The standards sets a permissible exposure limit (PEL) of fifty micrograms of lead per cubic meter of air (50 ug/m(3)), averaged over an 8-hour work-day. This is the highest level of lead in air to which you may be permissibly exposed over an 8-hour workday. Since it is an 8-hour average it permits short exposures above the PEL so long as for each 8-hour work day your average exposure does not exceed the PEL.

This standard recognizes that your daily exposure to lead can extend beyond a typical 8-hour workday as the result of overtime or other alterations in your work schedule. To deal with this, the standard contains a formula which reduces your permissible exposure when you are exposed more than 8 hours. For example, if you are exposed to lead for 10 hours a day, the maximum permitted average exposure would be 40 ug/m(3).

II. EXPOSURE MONITORING - PARAGRAPH (D)

If lead is present in the workplace where you work in any quantity, your employer is required to make an initial determination of whether the action level is exceeded for any employee. This initial determination must include instrument monitoring of the air for the presence of lead and must cover the exposure of a representative number of employees who are reasonably believed to have the highest exposure levels. If your employer has conducted appropriate air sampling for lead in the past year he may use these results. If there have been any employee complaints of symptoms which may be attributable to exposure to lead or if there is any other information or observations which would indicate employee exposure to lead, this must also be considered as part of the initial determination.

This initial determination must have been completed by March 31, 1979. If this initial determination shows that a reasonable possibility exists that any employee may be exposed, without regard to respirators, over the action level (30 ug/m(3)) your employer must set up an air monitoring program to determine the exposure level of every employee exposed to lead at your workplace.

In carrying out this air monitoring program, your employer is not required to monitor the exposure of every employee, but he must monitor a representative number of employees and job types. Enough sampling must be done to enable each employee's exposure level to be reasonably represented by at least one full shift (at least 7 hours) air sample. In addition, these air samples must be taken under conditions which represent each employee's regular, daily exposure to lead. All initial exposure monitoring must have been completed by May 30, 1979.

If you are exposed to lead and air sampling is performed, your employer is required to quickly notify you in writing of air monitoring results which represent your exposure. If the results indicate your exposure exceeds the PEL (without regard to your use of respirators), then your employer must also notify you of this in writing, and provide you with a description of the corrective action that will be taken to reduce your exposure.

Your exposure must be rechecked by monitoring every six months if your exposure is over the action level but below the PEL. Air monitoring must be repeated every 3 months if you are exposed over the PEL. Your employer may discontinue monitoring for you if 2 consecutive measurements, taken at least two weeks apart, are below the action level. However, whenever there is a production, process, control, or personnel change at your workplace which may result in new or additional exposure to lead, or whenever there is any other reason to suspect a change which may result in new or additional exposure to lead, your employer must perform additional monitoring.

III. METHODS OF COMPLIANCE - PARAGRAPH (E)

Your employer is required to assure that no employee is exposed to lead in excess of the PEL. The standard establishes a priority of methods to be used to meet the PEL.IV. RESPIRATORY PROTECTION - PARAGRAPH (F)

Your employer is required to provide and assure your use of respirators when your exposure to lead is not controlled below the PEL by other means. The employer must pay the cost of the respirator. Whenever you request one, your employer is also required to provide you a respirator even if your air exposure level does not exceed the PEL. You might desire a respirator when, for example, you have received medical advice that your lead absorption should be decreased. Or, you may intend to have children in the near future, and want to reduce the level of lead in your body to minimize adverse reproductive effects. While respirators are the least satisfactory means of controlling your exposure, they are capable of providing significant protection if properly chosen, fitted, worn, cleaned, maintained, and replaced when they stop providing adequate protection.

Your employer is required to select respirators from the seven types listed in Table II of the Respiratory Protection section of the standard. Any respirator chosen must be approved by the Mine Safety and Health Administration (MSHA) or the National Institute

for Occupational Safety and Health (NIOSH). This respirator selection table will enable your employer to choose a type of respirator which will give you a proper amount of protection based on your airborne lead exposure. Your employer may select a type of respirator that provides greater protection than that required by the standard; that is, one recommended for a higher concentration of lead than is present in your workplace. For example, a powered air purifying respirator (PAPR) is much more protective than a typical negative pressure respirator, and may also be more comfortable to wear. A PAPR has a filter, cartridge or canister to clean the air, and a power source which continuously blows filtered air into your breathing zone. Your employer might make a PAPR available to you to ease the burden of having to wear a respirator for long periods of time. The standard provides that you can obtain a PAPR upon request.

Your employer must also start a Respiratory Protection Program. This program must include written procedures for the proper selection, use, cleaning, storage, and maintenance of respirators.

Your employer must assure that your respirator facepiece fits properly. Proper fit of a respirator facepiece is critical. Obtaining a proper fit on each employee may require your employer to make available two or three different mask types. In order to assure that your respirator fits properly and that facepiece leakage is minimized, beginning on November 12, 1982, your employer must give you either a qualitative fit test in accordance with Appendix D of the standard or a quantitative fit test if you use a negative pressure respirator. Any respirator which has a filter, cartridge or canister which cleans the work room air before you breathe it and which requires the force of your inhalation to draw air thru the filtering element is a negative pressure respirator. A positive pressure respirator supplies air to you directly. A quantitative fit test uses a sophisticated machine to measure the amount, if any, of test material that leaks into the facepiece of your respirator.

You must also receive from your employer proper training in the use of respirators. Your employer is required to teach you how to wear a respirator, to know why it is needed, and to understand its limitations.

Until March 1, 1980, your employer must test the effectiveness of your negative pressure respirator initially and at least every six months thereafter with a "qualitative fit test." In this test, the fit of the facepiece is checked by seeing if you can smell a substance placed outside the respirator. If you can, there is appreciable leakage where the facepiece meets your face.

The standard provides that if your respirator uses filter elements, you must be given an opportunity to change the filter elements whenever an increase in breathing resistance is detected. You also must be permitted to periodically leave your work area to wash your face and respirator facepiece whenever necessary to prevent skin irritation. If you ever have difficulty in breathing during a fit test or while using a respirator, your employer must make a medical examination available to you to determine whether you can safely wear a respirator. The result of this examination may be to give you a positive pressure respirator (which reduces breathing resistance) or to provide alternative means of protection.

V. PROTECTIVE WORK CLOTHING AND EQUIPMENT - PARAGRAPH (G)

If you are exposed to lead above the PEL, or if you are exposed to lead compounds such as lead arsenate or lead azide which can cause skin and eye irritation, your employer must provide you with protective work clothing and equipment appropriate for the hazard. If work clothing is provided, it must be provided in a clean and dry condition at least weekly, and daily if your airborne exposure to lead is greater than 200 ug/m(3). Appropriate protective work clothing and equipment can include coveralls or similar full-body work clothing, gloves, hats, shoes or disposable shoe coverlets, and face shields or vented goggles. Your employer is required to provide all such equipment at no cost to you. He is responsible for providing repairs and replacement as necessary, and also is responsible for the cleaning, laundering or disposal of protective clothing and equipment. Contaminated work clothing or equipment must be removed in change rooms and not worn home or you will extend your exposure and expose your family since lead from your clothing can accumulate in your house, car, etc.Contaminated clothing which is to be cleaned, laundered or disposed of must be placed in closed containers in the change room. At no time may lead be removed from protective clothing or equipment by any means which disperses lead into the workroom air.

VI. HOUSEKEEPING - PARAGRAPH (H)

Your employer must establish a housekeeping program sufficient to maintain all surfaces as free as practicable of accumulations of lead dust. Vacuuming is the preferred method of meeting this requirement, and the use of compressed air to clean floors and other surfaces is absolutely prohibited. Dry or wet sweeping, shoveling, or brushing may not be used except where vacuuming or other equally effective methods have been tried and do not work. Vacuums must be used and emptied in a manner which minimizes the reentry of lead into the workplace.

VII. HYGIENE FACILITIES AND PRACTICES - PARAGRAPH (I)

The standard requires that change rooms, showers, and filtered air lunchrooms be constructed and made available to workers exposed to lead above the PEL. These requirements have temporarily been delayed by the court of appeals in situations where new facilities

must be constructed, or where substantial renovations must be made to existing facilities. When the PEL is exceeded, the employer must assure that food and beverage is not present or consumed, tobacco products are not present or used, and cosmetics are not applied, except in these facilities. Change rooms, showers, and lunchrooms, must be used by workers exposed in excess of the PEL. After showering, no clothing or equipment worn during the shift may be worn home, and this includes shoes and underwear. Your own clothing worn during the shift should be carried home and cleaned carefully so that it does not contaminate your home. Lunchrooms may not be entered with protective clothing or equipment unless surface dust has been removed by vacuuming, downdraft booth, or other cleaning method. Finally, workers exposed above the PEL must wash both their hands and faces prior to eating, drinking, smoking or applying cosmetics.

All of the facilities and hygiene practices just discussed are essential to minimize additional sources of lead absorption from inhalation or ingestion of lead that may accumulate on you, your clothes, or your possessions. Strict compliance with these provisions can virtually eliminate several sources of lead exposure which significantly contribute to excessive lead absorption.

VIII. MEDICAL SURVEILLANCE - PARAGRAPH (J)

The medical surveillance program is part of the standard's comprehensive approach to the prevention of lead-related disease. Its purpose is to supplement the main thrust of the standard which is aimed at minimizing airborne concentrations of lead and sources of ingestion. Only medical surveillance can determine if the other provisions of the standard have affectively protected you as an individual. Compliance with the standard's provision will protect most workers from the adverse effects of lead exposure, but may not be satisfactory to protect individual workers (1) who have high body burdens of lead acquired over past years, (2) who have additional uncontrolled sources of non-occupational lead exposure, (3) who exhibit unusual variations in lead absorption rates, or (4) who have specific non-work related medical conditions which could be aggravated by lead exposure (e.g., renal disease, anemia). In addition, control systems may fail, or hygiene and respirator programs may be inadequate. Periodic medical surveillance of individual workers will help detect those failures. Medical surveillance will also be important to protect your reproductive ability-regardless of whether you are a man or woman.

All medical surveillance required by the standard must be performed by or under the supervision of a licensed physician. The employer must provide required medical surveillance without cost to employees and at a reasonable time and place. The standard's medical surveillance program has two parts-periodic biological monitoring and medical examinations.

Your employer's obligation to offer you medical surveillance is triggered by the results of the air monitoring program. Medical surveillance must be made available to all employees who are exposed in excess of the action level for more than 30 days a year. The initial phase of the medical surveillance program, which includes blood lead level tests and medical examinations, must be completed for all covered employees no later than August 28, 1979. Priority within this first round of medical surveillance must be given to employees whom the employer believes to be at greatest risk from continued exposure (for example, those with the longest prior exposure to lead, or those with the highest current exposure). Thereafter, the employer must periodically make medical surveillance-both biological monitoring and medical examinations-available to all covered employees.

Biological monitoring under the standard consists of blood lead level (PbB) and zinc protoporphyrin tests at least every 6 months after the initial PbB test. A zinc protoporphyrin (ZPP) test is a very useful blood test which measures an effect of lead on your body. Thus biological monitoring under the standard is currently limited to PbB testing. If a worker's PbB exceeds 40 ug/100g the monitoring frequency must be increased from every 6 months to at least every 2 months and not reduced until two consecutive PbBs indicate a blood lead level below 40 ug/100g. Each time your PbB is determined to be over 40 ug/100g, your employer must notify you of this in writing within five working days of his receipt of the test results. The employer must also inform you that the standard requires temporary medical removal with economic protection when your PbB exceeds certain criteria. (See Discussion of Medical Removal Protection-Paragraph (k).) During the first year of the standard, this removal criterion is 80 ug/100g. Anytime your PbB exceeds 80 ug/100g your employer must make available to you a prompt follow-up PbB test to ascertain your PbB. If the two tests both exceed 80 ug/100g and you are temporarily removed, then your employer must make successive PbB tests available to you on a monthly basis during the period of your removal. Medical examinations beyond the initial one must be made available on an annual basis if your blood lead level exceeds 40 ug/100g at any time during the preceding year. The initial examination will provide information to establish a baseline to which subsequent data can be compared. An initial medical examination must also be made available (prior to assignment) for each employee being assigned for the first time to an area where the airborne concentration of lead equals or exceeds the action level. In addition, a medical examination or consultation must be made available as soon as possible if you notify your employer that you are experiencing signs or symptoms commonly associated with lead poisoning or that you have difficulty breathing while wearing a respirator or during a respirator fit test. You must also be provided a medical examination or consultation if you notify your employer that you desire medical advice concerning the effects of current or past exposure to lead on your ability to procreate a healthy child.

Finally, appropriate follow-up medical examinations or consultations may also be provided for employees who have been temporarily removed from exposure under the medical removal protection provisions of the standard. (See Part IX, below.)

The standard specifies the minimum content of pre-assignment and annual medical examinations. The content of other types of medical examinations and consultations is left up to the sound discretion of the examining physician. Pre-assignment and annual medical examinations must include (1) a detailed work history and medical history, (2) a thorough physical examination, and (3) a series of laboratory tests designed to check your blood chemistry and your kidney function. In addition, at any time upon your request, a laboratory evaluation of male fertility will be made (microscopic examination of a sperm sample), or a pregnancy test will be given.

The standard does not require that you participate in any of the medical procedures, tests, etc. which your employer is required to make available to you. Medical surveillance can, however, play a very important role in protecting your health. You are strongly encouraged, therefore, to participate in a meaningful fashion. The standard contains a multiple physician review mechanism which would give you a chance to have a physician of your choice directly participate in the medical surveillance program. If you were dissatisfied with an examination by a physician chosen by your employer, you could select a second physician to conduct an independent analysis. The two doctors would attempt to resolve any differences of opinion, and select a third physician to resolve any firm dispute. Generally your employer will choose the physician who conducts medical surveillance under the lead standard-unless you and your employer can agree on the choice of a physician or physicians. Some companies and unions have agreed in advance, for example, to use certain independent medical laboratories or panels of physicians. Any of these arrangements are acceptable so long as required medical surveillance is made available to workers.

The standard requires your employer to provide certain information to a physician to aid in his or her examination of you. This information includes (1) the standard and its appendices, (2) a description of your duties as they relate to lead exposure, (3) your exposure level, (4) a description of personal protective equipment you wear, (5) prior blood lead level results, and (6) prior written medical opinions concerning you that the employer has. After a medical examination or consultation the physician must prepare a written report which must contain (1) the physician's opinion as to whether you have any medical condition which places you at increased risk of material impairment to health from exposure to lead, (2) any recommended special protective measures to be provided to you, (3) any blood lead level determinations, and (4) any recommended limitation on your use of respirators. This last element must include a determination of whether you can wear a powered air purifying respirator (PAPR) if you are found unable to wear a negative pressure respirator.

The medical surveillance program of the lead standard may at some point in time serve to notify certain workers that they have acquired a disease or other adverse medical condition as a result of occupational lead exposure. If this is true, these workers might have legal rights to compensation from public agencies, their employers, firms that supply hazardous products to their employers, or other persons. Some states have laws, including worker compensation laws, that disallow a worker who learns of a job-related health impairment to sue, unless the worker sues within a short period of time after learning of the impairment. (This period of time may be a matter of months or years.) An attorney can be consulted about these possibilities. It should be stressed that OSHA is in no way trying to either encourage or discourage claims or lawsuits. However, since results of the standard's medical surveillance program can significantly affect the legal remedies of a worker who has acquired a job-related disease or impairment, it is proper for OSHA to make you aware of this.

The medical surveillance section of the standard also contains provisions dealing with chelation. Chelation is the use of certain drugs (administered in pill form or injected into the body) to reduce the amount of lead absorbed in body tissues. Experience accumulated by the medical and scientific communities has largely confirmed the effectiveness of this type of therapy for the treatment of very severe lead poisoning. On the other hand, it has also been established that there can be a long list of extremely harmful side effects associated with the use of chelating agents. The medical community has balanced the advantages and disadvantages resulting from the use of chelating agents in various circumstances and has established when the use of these agents is acceptable. The standard includes these accepted limitations due to a history of abuse of chelation therapy by some lead companies. The most widely used chelating agents are calcium disodium EDTA, (Ca Na2 EDTA), Calcium Disodium Versenate (Versenate), and d-penicillamine (pencillamine or Cupramine).

The standard prohibits "prophylactic chelation" of any employee by any person the employer retains, supervises or controls. "Prophylactic chelation" is the routine use of chelating or similarly acting drugs to prevent elevated blood levels in workers who are occupationally exposed to lead, or the use of these drugs to routinely lower blood lead levels to predesignated concentrations believed to be `safe'. It should be emphasized that where an employer takes a worker who has no symptoms of lead poisoning and has chelation carried out by a physician (either inside or outside of a hospital) solely to reduce the worker's blood lead level, that will generally be considered prophylactic chelation. The use of a hospital and a physician does not mean that prophylactic chelation is not being performed. Routine chelation to prevent increased or reduce current blood lead levels is unacceptable whatever the setting.

The standard allows the use of "therapeutic" or "diagnostic" chelation if administered under the supervision of a licensed physician in a clinical setting with thorough and appropriate medical monitoring. Therapeutic chelation responds to severe lead poisoning where there are marked symptoms. Diagnostic chelation involved giving a patient a dose of the drug then collecting all urine excreted for some period of time as an aid to the diagnosis of lead poisoning.

In cases where the examining physician determines that chelation is appropriate, you must be notified in writing of this fact before such treatment. This will inform you of a potentially harmful treatment, and allow you to obtain a second opinion.

IX. MEDICAL REMOVAL PROTECTION - PARAGRAPH (K)

Excessive lead absorption subjects you to increased risk of disease. Medical removal protection (MRP) is a means of protecting you when, for whatever reasons, other methods, such as engineering controls, work practices, and respirators, have failed to provide the protection you need. MRP involves the temporary removal of a worker from his or her regular job to a place of significantly lower exposure without any loss of earnings, seniority, or other employment rights or benefits. The purpose of this program is to cease further lead absorption and allow your body to naturally excrete lead which has previously been absorbed. Temporary medical removal can result from an elevated blood lead level, or a medical opinion. Up to 18 months of protection is provided as a result of either form of removal. The vast majority of removed workers, however, will return to their former jobs long before this eighteen month period expires. The standard contains special provisions to deal with the extraordinary but possible case where a longterm worker's blood lead level does not adequately decline during eighteen months of removal.

During the first year of the standard, if your blood lead level is 80 ug/100g or above you must be removed from any exposure where your air lead level without a respirator would be 100 ug/m(3) or above. If you are removed from your normal job you may not be returned until your blood lead level declines to at least 60 ug/100g. These criteria for removal and return will change according to the following schedule:

	Removal blood lead (ug/100 g)	Air lead (ug/m(3))	Return blood lead (ug/100 g)
After Mar. 1, 1980..	70 and above....	50 and above.	At or below 50.
After Mar. 1, 1981..	60 and above....	30 and above.	At or below 40.
After Mar. 1, 1983..	50 and above averaged over six months.....	30 and above.	Do.

You may also be removed from exposure even if your blood lead levels are below these criteria if a final medical determination indicates that you temporarily need reduced lead exposure for medical reasons. If the physician who is implementing your employers medical program makes a final written opinion recommending your removal or other special protective measures, your employer must implement the physician's recommendation. If you are removed in this manner, you may only be returned when the doctor indicates that it is safe for you to do so. The standard does not give specific instructions dealing with what an employer must do with a removed worker. Your job assignment upon removal is a matter for you, your employer and your union (if any) to work out consistent with existing procedures for job assignments. Each removal must be accomplished in a manner consistent with existing collective bargaining relationships. Your employer is given broad discretion to implement temporary removals so long as no attempt is made to override existing agreements. Similarly, a removed worker is provided no right to veto an employer's choice which satisfies the standard.

In most cases, employers will likely transfer removed employees to other jobs with sufficiently low lead exposure. Alternatively, a worker's hours may be reduced so that the time weighted average exposure is reduced, or he or she may be temporarily laid off if no other alternative is feasible. In all of these situation, MRP benefits must be provided during the period of removal - i.e., you continue to receive the same earnings, seniority, and other rights and benefits you would have had if you had not been removed. Earnings includes more than just your base wage; it includes overtime, shift differentials, incentives, and other compensation you would have

earned if you had not been removed. During the period of removal you must also be provided with appropriate follow-up medical surveillance. If you were removed because your blood lead level was too high, you must be provided with a monthly blood test. If a medical opinion caused your removal, you must be provided medical tests or examinations that the doctor believes to be appropriate. If you do not participate in this follow up medical surveillance, you may lose your eligibility for MRP benefits.

When you are medically eligible to return to your former job, your employer must return you to your "former job status." This means that you are entitled to the position, wages, benefits, etc., you would have had if you had not been removed. If you would still be in your old job if no removal had occurred that is where you go back. If not, you are returned consistent with whatever job assignment discretion your employer would have had if no removal had occurred. MRP only seeks to maintain your rights, not expand them or diminish them. If you are removed under MRP and you are also eligible for worker compensation or other compensation for lost wages, your employer's MRP benefits obligation is reduced by the amount that you actually receive from these other sources. This is also true if you obtain other employment during the time you are laid off with MRP benefits. The standard also covers situations where an employer voluntarily removes a worker from exposure to lead due to the effects of lead on the employee's medical condition, even though the standard does not require removal. In these situations MRP benefits must still be provided as though the standard required removal. Finally, it is important to note that in all cases where removal is required, respirators cannot be used as a substitute. Respirators may be used before removal becomes necessary, but not as an alternative to a transfer to a low exposure job, or to a lay-off with MRP benefits.

X. EMPLOYEE INFORMATION AND TRAINING - PARAGRAPH (L)

Your employer is required to provide an information and training program for all employees exposed to lead above the action level or who may suffer skin or eye irritation from lead. This program must inform these employees of the specific hazards associated with their work environment, protective measures which can be taken, the danger of lead to their bodies (including their reproductive systems), and their rights under the standard. In addition your employer must make readily available to all employees, including those exposed below the action level, a copy of the standard and its appendices and must distribute to all employees any materials provided to the employer by the Occupational Safety and Health Administration (OSHA).

Your employer is required to complete this training program for all employees by August 28, 1979. After this date, all new employees must be trained prior to initial assignment to areas where there is a possibility of exposure over the action level. This training program must also be provided at least annually thereafter.

XI. SIGNS - PARAGRAPH (M)

The standard requires that the following warning sign be posted in work areas where the exposure to lead exceeds the PEL:

WARNING

LEAD WORK AREA

NO SMOKING OR EATING

XII. RECORDKEEPING - PARAGRAPH (N)

Your employer is required to keep all records of exposure monitoring for airborne lead. These records must include the name and job classification of employees measured, details of the sampling and analytic techniques, the results of this sampling, and the type of respiratory protection being worn by the person sampled. Your employer is also required to keep all records of biological monitoring and medical examination results. These must include the names of the employees, the physician's written opinion, and a copy of the results of the examination. All of the above kinds of records must be kept for 40 years, or for at least 20 years after your termination of employment, whichever is longer.

Recordkeeping is also required if you are temporarily removed from your job under the medical removal protection program. This record must include your name and social security number, the date of your removal and return, how the removal was or is being accomplished, and whether or not the reason for the removal was an elevated blood lead level. Your employer is required to keep each medical removal record only for as long as the duration of an employee's employment.

The standard requires that if you request to see or copy environmental monitoring, blood lead level monitoring, or medical removal records, they must be made available to you or to a representative that you authorize. Your union also has access to these records. Medical records other than PbB's must also be provided upon request to you, to your physician or to any other person whom you may specifically designate. Your union does not have access to your personal medical records unless you authorize their access.

XIII. OBSERVATIONS OF MONITORING - PARAGRAPH (O)

When air monitoring for lead is performed at your workplace as required by this standard, your employer must allow you or someone you designate to act as an observer of the monitoring. Observers are entitled to an explanation of the measurement procedure, and to record the results obtained. Since results will not normally be available at the time of the monitoring, observers are entitled to record or receive the results of the monitoring when returned by the laboratory. Your employer is required to provide the observer with any personal protective devices required to be worn by employees working in the area that is being monitored. The employer must require the observer to wear all such equipment and to comply with all other applicable safety and health procedures.

XIV. EFFECTIVE DATE - PARAGRAPH (P)

The standard's effective data is March 1, 1979, and employer obligations under the standard begin to come into effect as of that date.

XV. FOR ADDITIONAL INFORMATION

A. Copies of the Standard and explanatory material may be obtained by writing or calling the OSHA Docket Office, U.S. Department of Labor, room N2634, 200 Constitution Avenue, N.W., Washington DC 20210. Telephone: (202) 219-7894.

1. The standard and summary of the statement of reasons (preamble), Federal Register, Volume 43, pp. 52952-53014, November 14, 1978.

2. The full statement of reasons (preamble) Federal Register, vol. 43, pp. 54354-54509, November 21, 1978.

3. Partial Administrative Stay and Corrections to the standard, (44 FR 5446-5448) January 26, 1979.

4. Notice of the Partial Judicial Stay (44 FR 14554-14555) March 13,1979.

5. Corrections to the preamble, Federal Register, vol. 44, pp. 20680-20681, April 6, 1979.

6. Additional correction to the preamble concerning the construction industry, Federal Register, vol. 44, p. 50338, August 28, 1979.

7. Appendices to the standard (Appendices A, B, C), Federal Register, Vol. 44, pp. 60980-60995, October 23, 1979.

8. Corrections to appendices, Federal Register, Vol. 44, 68828, November 30, 1979.

9. Revision to the standard and an additional appendix (Appendix D), Federal Register, Vol. 47, pp. 51117-51119, November 12, 1982.

10. Notice of reopening of lead rulemaking for nine remand industry sectors, Federal Register, vol. 53, pp. 11511-11513, April 7, 1988.

11. Statement of reasons, Federal Register, vol. 54, pp. 29142-29275, July 11, 1989.

12. Statement of reasons, Federal Register, vol. 55, pp. 3146-3167, January 30, 1990.

13. Correction to appendix B, Federal Register, vol. 55, pp.4998-4999, February 13, 1991.

14. Correction to appendices, Federal Register, vol. 56, p. 24686, May 31, 1991.

B. Additional information about the standard, its enforcement, and your employer's compliance can be obtained from the nearest OSHA Area Office listed in your telephone directory under United States Government/Department of Labor.

[60 FR 52856, Oct. 11, 1995]

Attachment 3
Health and Safety Self Assessment

CH2MHILL *JOBSITE SAFETY INSPECTION CHECKLIST* Date: 05/06/98

Note: The following jobsite safety inspection checklist is to be used only at locations where CH2M HILL controls the work. It is not to be used at locations where others control the work.

Project Name: Bunker Hill Project No.: 106356

Location: Kellogg, Idaho Project Manager: Joan Stoupa

Inspector: _____ Date: _____

This checklist has been prepared specifically for the FSI or HSP indicated above. The first sections are applicable to all projects. The next sections address specific situations such as hazardous waste, construction activities, and office trailers. There may be some duplication between the two sections.

If an item is not applicable, the column titled "N/A" should be checked. If an item is applicable but the auditor does not observe it during the inspection, the "N/O" column should be checked. For each deficiency noted, a Health and Safety Audit Finding Form must be completed. The Corporate Health and Safety Director must be copied on the results of all audits.

Check "Yes" for Items Completed	Yes	No	N/A	N/O
HAZARDOUS WASTE				
Certification and Training of CH2M HILL Personnel				
1. Medical exam within last 12 months	☐	☐	☐	☐
2. 40-hour initial training, 3 days supervised field activities, 8-hour annual refresher	☐	☐	☐	☐
3. First aid and CPR certification	☐	☐	☐	☐
4. Quantitatively fit tested (preferred method per NIOSH Publication 87-116, Appendix B.3)	☐	☐	☐	☐
5. Attend pre-entry safety meeting	☐	☐	☐	☐
6. Site Safety Coordinator with appropriate training	☐	☐	☐	☐
Certification and Training of Subcontractor Personnel				
1. Medical exam within last 12 months	☐	☐	☐	☐
2. 40-hour initial training, 3 days supervised field activities, 8-hour annual refresher	☐	☐	☐	☐
3. First aid and CPR certification	☐	☐	☐	☐
4. Quantitatively fit tested (preferred method per NIOSH Publication 87-116, (Appendix B.3)	☐	☐	☐	☐
5. Attend pre-entry safety meeting	☐	☐	☐	☐
Site Safety Documentation				
1. Site safety plan (SSP) prepared and approved	☐	☐	☐	☐
2. SSP onsite	☐	☐	☐	☐
3. All personnel onsite identified in SSP	☐	☐	☐	☐

CH2M HILL JOBSITE SAFETY INSPECTION CHECKLIST

Date: 05/06/98

STANDARD OF PRACTICE HS-18 - HEALTH AND SAFETY CHECKLIST

Check "Yes" for Items Completed		Yes	No	N/A	N/O
4.	Documentation of safety briefing	☐	☐	☐	☐
5.	Hospital map posted	☐	☐	☐	☐
6.	Phone numbers posted	☐	☐	☐	☐
7.	Emergency vehicle identified	☐	☐	☐	☐
8.	Material Safety Data Sheets (MSDSs) onsite	☐	☐	☐	☐
9.	Work zones delineated (How? _____)	☐	☐	☐	☐
10.	Wind direction flags in use	☐	☐	☐	☐
11.	Documentation of calibration of monitoring equipment in clean environment	☐	☐	☐	☐
12.	Monitoring conducted and recorded as specified in SSP (Frequency? _____)	☐	☐	☐	☐
13.	Monitoring for heat/cold stress	☐	☐	☐	☐
14.	Buddy system in use	☐	☐	☐	☐
15.	Decontamination procedures established as specified in SSP	☐	☐	☐	☐
16.	No eating, drinking, or smoking in exclusion and contamination reduction zones	☐	☐	☐	☐
17.	Toilet facilities provided	☐	☐	☐	☐
18.	533 Forms completed	☐	☐	☐	☐
19.	No contact lenses	☐	☐	☐	☐
20.	Work conducted during daylight hours only	☐	☐	☐	☐

Emergency equipment available as specified in SSP

(What?) _____

_____

_____

_____

_____

_____

CH2M HILL JOBSITE SAFETY INSPECTION CHECKLIST

Date: 05/06/98

STANDARD OF PRACTICE HS-18 - HEALTH AND SAFETY CHECKLIST

Check "Yes" for Items Completed		Yes	No	N/A	N/O
Safety Briefing					
1.	All personnel attended (including new personnel)	☐	☐	☐	☐
2.	Documentation of meetings	☐	☐	☐	☐
3.	Chemical hazards and toxicology reviewed	☐	☐	☐	☐
4.	Physical hazards reviewed	☐	☐	☐	☐
5.	Biological hazards reviewed	☐	☐	☐	☐
6.	Heat/cold stress information reviewed	☐	☐	☐	☐
7.	Air monitoring requirements	☐	☐	☐	☐
8.	Levels of protection reviewed	☐	☐	☐	☐
9.	Work zones reviewed	☐	☐	☐	☐
10.	Decontamination procedures reviewed	☐	☐	☐	☐
11.	Emergency response procedures reviewed	☐	☐	☐	☐
12.	Site communications	☐	☐	☐	☐
Personal Protective Equipment (ppe)					
1.	Levels of protection being worn as specified in SSP	☐	☐	☐	☐
2.	All appropriate PPE available onsite	☐	☐	☐	☐
3.	Hard hats being worn	☐	☐	☐	☐
4.	Appropriate hand protection being used	☐	☐	☐	☐
(What?)	_____				
5.	Appropriate body protection being used	☐	☐	☐	☐
(What?)	_____				
6.	Appropriate eye protection begin used	☐	☐	☐	☐
(What?)	_____				
7.	Appropriate ear protection being used	☐	☐	☐	☐
8.	Appropriate respirator protection being used	☐	☐	☐	☐
9.	Respirators donned correctly	☐	☐	☐	☐

CH2M HILL JOBSITE SAFETY INSPECTION CHECKLIST

Date: 05/06/98

STANDARD OF PRACTICE HS-18 - HEALTH AND SAFETY CHECKLIST

Check "Yes" for Items Completed			Yes	No	N/A	N/O
10.		TLD badges being used	☐	☐	☐	☐
11.	(Type?) _____	If air purifying respirators (APRs) are being used, correct cartridges	☐	☐	☐	☐
12.	air being used	If self contained breathing apparatuses (SCBAs) are being used, is grade D	☐	☐	☐	☐
13.		If SCBAs are being used, are cylinders stored correctly	☐	☐	☐	☐
14.		If personal protective equipment (PPE) is not onsite, prepared to halt work	☐	☐	☐	☐
15.		Disposal methods in place for disposable PPE	☐	☐	☐	☐
Decontamination Procedures						
1.		Decontamination procedure established as specified in the SSP	☐	☐	☐	☐
2.		Decontamination zone clearly defined	☐	☐	☐	☐
3.	(How?) _____	PPE properly decontaminated	☐	☐	☐	☐
4.	(How?) _____	Sampling equipment properly decontaminated	☐	☐	☐	☐
5.	(How?) _____	Monitoring equipment properly decontaminated	☐	☐	☐	☐
6.	(How?) _____	Heavy equipment properly decontaminated	☐	☐	☐	☐
7.	(How?) _____	Samples properly decontaminated	☐	☐	☐	☐
8.		Decontamination fluids appropriately disposed of	☐	☐	☐	☐

AMENDMENT 2
CH2M HILL HEALTH AND SAFETY PLAN

This amendment must accompany the health and safety plan (HSP) for Bunker Hill approved on 5/6/98. The purpose of the HSP amendment is to include supplemental information, as it becomes available. Supplemental information is used to reevaluate hazards associated with the planned tasks and to revise protective procedures (e.g., air monitoring). Where the amendment contains information different from the HSP, the amendment will take precedence for the specified task. The amendment includes new information or revises existing HSP information. Sections of the HSP that are not addressed in the amendments do not have changes; therefore, the HSP will be followed. All employees performing tasks covered by this amendment must read both the HSP and this amendment and agree to abide by their provisions (see Attachment 1).

1 PROJECT INFORMATION AND DESCRIPTION

CLIENT OR OWNER: USEPA **PROJECT NO:** 148562.

CH2M HILL PROJECT MANAGER: Jim Stefanoff **OFFICE:** SEA

SITE NAME: Bunker Hill

SITE ADDRESS: Shoshone County, Idaho

DATE HEALTH AND SAFETY PLAN PREPARED: June 1994, updated April 1998

DATE(S) OF INITIAL VISIT:

DATE(S) OF SITE WORK: May 1998 to September 1999

1.1 GENERAL SITE DESCRIPTION AND HISTORY

Figure 1 shows the Milo Gulch area and the Bunker Hill Mine Entrance

2 PROJECT ORGANIZATION AND TASKS TO BE PERFORMED UNDER THIS PLAN

2.1 PROJECT ORGANIZATION

CLIENT:

USEPA
Mary Kay Voytilla
(206) 553-2712

CH2M HILL:

Project Manager: Jim Stefanoff/SPK
Field Team Leader: Bill Hudson/DJN Inc.
Refer to Section 4 for field staff.

CONTRACTORS and SUBCONTRACTORS: Refer to Section 4.2.

2.2 DESCRIPTION OF TASKS

(Reference Section 1, "Field Activity Start-up Form," of Site Safety Notebook

Refer to project documents (i.e., work plan) for detailed task information. A health and safety risk analysis has been performed for each task and is incorporated in this plan through task-specific hazard controls and requirements for monitoring and protection. Tasks in addition to those listed below require an approved amendment to this plan before additional work begins. Refer to Section 10.2 for procedures related to tasks that do not involve hazardous waste operations and emergency response (Hazwoper).

2.2.1 HAZWOPER-REGULATED TASKS

- Monitoring Treatment Plant Operation
- Hiking in Milo Gulch
- If there is exposure to contaminated water
- If intrusive activities are performed

2.2. NON-HAZWOPER-REGULATED TASKS

Under specific circumstances, the training and medical monitoring requirements of federal or state Hazwoper regulations are not applicable. It must be demonstrated that the tasks can be performed without the possibility of exposure in order to use non-Hazwoper-trained personnel. **Prior approval from the HSM is required before these tasks are conducted on regulated hazardous waste sites.**

TASK	RESTRICTIVE CONDITIONS
• Treatment Plant	No exposure to contaminated water
• Hiking	No intrusive tasks are allowed while hiking around in the Milo Gulch area.

2.3. MSHA-REGULATED TASKS

Work inside the Bunker Hill Mine is governed by Mine Safety and Health Administration regulations. Personnel engaged activities in the mine must attend a briefing on the specific mine hazards by the mine operator, be trained in the use of rescue breathing apparatus, and be accompanied by someone with 40-hour MSHA training or be 40-hour MSHA trained themselves.

TASK	RESTRICTIVE CONDITIONS
• Install Flume	
• Periodic site reconaissance and Flume montoring	

3.3 GENERAL PHYSICAL (SAFETY) HAZARDS AND CONTROLS

Engineering and administrative controls are to be implemented by the party in control of the site or the hazard (i.e., CH2M HILL, subcontractor, or contractor). CH2M HILL employees and subcontractors must, at a minimum, remain aware of hazards affecting them regardless of who is responsible for controlling the hazards. Specialty subcontractors are responsible for the safe operation of their equipment (e.g., drill rig, heavy equipment). CH2M HILL employees are not to operate, or assist in the operation of, any subcontractor or contractor equipment.

Hazard (Refer to SOP, or HSP Section)	Engineering Controls, Administrative Controls, and Work Practices	Under ground work, Weir intallation	Hiking
Cave In	Underground work in the mine is allowed only after a competent person has evaluated the structural integrity of the area of the mine to be accessed. All structural elements that the competent person identifies as inadequate or questionable must be repaired prior to entry by CH2M HILL staff.	X	
Contact with Low pH water	• Acid resistant boots or hip waders must be worn. The protective footware must extend a minimum of 12 inches above the depth of the deepest water that must be traversed. • Acid resistant gloves must be worn when traversing areas that have poor footing and hand holds must be used • Acid resistant gloves must be used when conducting any activity that requires contact with any mine water. • At least 2 bottles of buffered eyewash solution must be carried into the mine in all areas with groundwater.	X	
Slips, trips, and falls	• Use mechanical aids, when possible, to transport materials to construct the flume. • Hand rails and other aids should be considered where steep or uneven terrain must be crossed.	X	
Blisters	• Blisters most commonly occur on the feet, especially if someone uses inappropriate socks, wet socks or boots, or boots that do not fit or are not broken in. Preventing blisters is the most important first aid: if someone feels a "hot spot" starting (from friction between the skin and the boot) stop immediately and do something about it. Place a thin layer of moleskin or (believe it or not) duct tape on the affected area. If you don't take care of the hot spot, it will become a blister proper: in this case, use the moleskin, but with a hole in it, so that you don't place adhesive directly over the blister. You want to minimize pressure on the blister by building up protective padding around it, but not too much or you'll cause more problems. Generally you should not pop blisters, both because they can become infected, and because they may be more painful that way as you return.		X

3.3 GENERAL PHYSICAL (SAFETY) HAZARDS AND CONTROLS

Engineering and administrative controls are to be implemented by the party in control of the site or the hazard (i.e., CH2M HILL, subcontractor, or contractor). CH2M HILL employees and subcontractors must, at a minimum, remain aware of hazards affecting them regardless of who is responsible for controlling the hazards. Specialty subcontractors are responsible for the safe operation of their equipment (e.g., drill rig, heavy equipment). CH2M HILL employees are not to operate, or assist in the operation of, any subcontractor or contractor equipment.

Hazard (Refer to SOP, or HSP Section)	Engineering Controls, Administrative Controls, and Work Practices	Under ground work, Weir intallation	Hiking
Sunburn	• Sunburn can increase risk of cancer. Also, by the time we feel sunburnt, it's too late. This is especially true in winter, when we don't feel hot even though the sun beats down on us and reflects off the snow into our faces. We can best prevent sunburn by covering up and by frequently applying copious amounts of sunblock with a high SPF rating (16 or higher). First aid is the same as for any burn: if the skin is blistered, cover it with a loose sterile gauze dressing.		X
Headaches	• Headaches result from many different things: dehydration, sunlight, tension, etc. You can best treat the headache by treating the cause, if you know it. Suggest that the person affected take aspirin, acetaminophen (e.g., Tylenol), or ibuprofen (e.g., Advil), drink water, eat a little, and, if possible, take a rest break. Wearing sunglasses may prevent headaches from too much sunlight.		X
Nosebleeds	• Nosebleeds more commonly occur in cold than in hot weather because of the very dry air. If someone gets a nosebleed, try to stop the bleeding by pinching the nostrils with your fingers. Be patient, because nosebleeds often take a while to stop. If pinching the nostrils doesn't work, you may insert a small, clean pad of gauze into the affected nostril, and pinch it again. If someone is prone to nosebleeds, especially in cold weather, it may help to wear a bandanna. As he or she breathes out, the bandanna traps some warmer, moist air, which may be enough to prevent a nosebleed.		
Fainting	• Fainting results from loss of blood from the brain and is best treated by lowering the head in relation to the heart. If someone feels faint, have him or her sit down, or lie down (on a sleeping pad or some other insulation, if possible) until feeling better. Only allow him or her to stand up slowly when he or she feels able.		X
Cuts and Scrapes	• Take the time to wash the cut with soap and water, or an antiseptic towlette. Cleaning the wound immediately will help prevent infection later.		X
Cramps	• If someone experiences muscle cramps, have him or her sit or lie down and relax. Massage and stretch the sore muscle slowly, gently, and carefully. Have him or her drink water, eat a little, and start again slowly. Drinking a sports drink like Gatorade will help replace salts that are lost because of sweating. Replacing these salts may help reduce the muscle cramps and prevent them from recurring.		X

3.3 GENERAL PHYSICAL (SAFETY) HAZARDS AND CONTROLS

Engineering and administrative controls are to be implemented by the party in control of the site or the hazard (i.e., CH2M HILL, subcontractor, or contractor). CH2M HILL employees and subcontractors must, at a minimum, remain aware of hazards affecting them regardless of who is responsible for controlling the hazards. Specialty subcontractors are responsible for the safe operation of their equipment (e.g., drill rig, heavy equipment). CH2M HILL employees are not to operate, or assist in the operation of, any subcontractor or contractor equipment.

Hazard (Refer to SOP, or HSP Section)	Engineering Controls, Administrative Controls, and Work Practices	Under ground work, Weir intallation	Hiking
Sprains	• If the sprain is minor, the victim may be able to walk with little or no assistance. To reduce the swelling of a minor sprain, you must put ice on the injury (of course, be careful of frostbite and hypothermia in cold weather). You will also need to tape the injured joint using sports tape or an ace bandage and allow the injured person to take ibuprofen (only if they are not allergic to aspirin), if they intend to walk out. On the other hand, major sprains may appear to be fractures and should be treated as such. Splint the injury and plan the best way to get the victim to medical care.		X
Drinking Water	• Never drink untreated water from streams or lakes. Many areas are prone to natural contamination (e.g., girardia). All drinking water must be packed in, or properly treated.		X
Lightning	• Avoid working during thunderstorms. If caught in one, seek shelter among densely wooded areas. Avoid lone trees as shelter. Avoid open, bare areas. Do not cross water bodies. If caught in open area, place feet close together and crouch down as small as possible, without lying on the ground. Ground strikes are know to be initiated by "leaders", or charges, from the earth making a connection to the charge in the clouds. This may cause your hair to stand up, and since you do not want to be part of a leader the makes the connection to form a cloud-to-ground strike, immediately crouch as described above.		X
Steep slopes/Uneven ground/Rock and shale slopes	• Always avoid these areas whenever possible. "climbing" in these areas should be minimized and limited to that which does not require the using climbing equipment. Exercise caution is relying on rocks and trees/tree stumps to support yourself – many times they are loose. Whenever possible, switchback your way up/down steep areas, and maintain a slow pace with firm footing.		X
Water Crossings	• Traversing streams presents significant hazards, including drowning, hypothermia, and abrasions. When crossing streams, do seek out the safest route – narrow, low flow, shallow, and not immediately upstream of just the opposite. Also, avoid areas where there are submerged or partially submerged trees/tree branches – these can create entanglement hazards during a crossing or a "swim". Streams should be crossed while facing upstream, stepping side to side, and using a sturdy walking stick. • If streams are crossed that are deeper than "crotch deep", staff must use either ropes or wear chest waders. Ropes should be tied off on one side, and held by the person crossing. Once across, the rope should again be tied off so that the second person can hold to a secure line. Streams that are deeper than mid-chest deep should not be crossed – find a crossing that is less deep.		X

4.1 CH2M HILL EMPLOYEE MEDICAL SURVEILLANCE AND TRAINING

(Reference CH2M HILL SOP HS-01, *Medical Surveillance*, and HS-02, *Health and Safety Training*)
The employees listed below are enrolled in the CH2M HILL Comprehensive Health and Safety Program and meet state and federal hazardous waste operations requirements for 40-hour initial training, 3-day on-the-job experience, and 8-hour annual refresher training. Employees designated "SSC" have received 8 hours of supervisor and instrument training and can serve as site safety coordinator (SSC) for the level of protection indicated. An SSC with a level designation (D, C, B) equal to or greater than the level of protection being used must be present during all tasks performed in exclusion or decontamination zones that involve the potential for exposure to health and safety hazards. Employees designated "FA-CPR" are currently certified by the American Red Cross, or equivalent, in first aid and CPR. At least one FA-CPR designated employee must be present during all tasks performed in exclusion or decontamination zones that involve the potential for exposure to health and safety hazards. The employees listed below are currently active in a medical surveillance program that meets state and federal regulatory requirements for hazardous waste operations. Certain tasks (e.g., confined-space entry) and contaminants (e.g., lead) may require additional training and medical monitoring.

Pregnant employees are to be informed of and are to follow the procedures in CH2M HILL's SOP HS-04, *Reproduction Protection*, including obtaining a physician's statement of the employee's ability to perform hazardous activities, before being assigned fieldwork

Employee Name	Office	Responsibility	MSHA/SSC/FA-CPR
Bill Hudson/DJN Inc.		MSHA trained/Technical Leader	MSHA
John Riley/Pyrite Hydrochem		MSHA trained/Field Team Member	MSHA
Jim Stefanoff	SPK	Project Manager/SSC	Level D SSC; FA
Matt Germon	SPK	Field Team Member/SSC	Level D SSC; FA-CPR
Nahide Gulensoy	SPK	Field Team Member	No Hazwoper tasks
Travis Pyle	SPK	Field Team Member	FA-CPR
John Winters	RLO	Field Team Member	No Hazwoper tasks
Bob York	SEA	Field Team Member	No Hazwoper tasks
Jim Mavis	SEA	Field Team Member	No Hazwoper tasks
Joan Stoupa	SEA	Field Team Member	No Hazwoper tasks
Ken Green	SEA	Field Team Member	No Hazwoper tasks
Frances Parton	SPK	Field Team Member/SSC	Level C SSC: FA-CPR

4.2 FIELD TEAM CHAIN OF COMMAND AND COMMUNICATION PROCEDURES

4.2.1 CLIENT

Contact Name: Mary Kay Voytilla
Phone: (206) 553-2712

4.2.2 CH2M HILL

Project Manager: Jim Stefanoff/SPK
Health and Safety Manager: Jim Bushnell/SEA
Field Team Technical Leader: Bill Hudson/DJN Inc./Bunker Hill
MSHA Trained Staff: Bill Hudson/DJN Inc./Bunker Hill
John Riley/Pyrite Hydrochem

4.2.3 SUBCONTRACTORS
(Reference Section 3, *Corporate Health and Safety Program Manual)*

When specified in the project documents (e.g., contract), this plan may cover CH2M HILL subcontractors. However, this plan does not address hazards associated with tasks and equipment that the subcontractor has expertise in (e.g., operation of drill rig). Specialty subcontractors are responsible for health and safety procedures and plans specific to their work. Specialty subcontractors are to submit plans to CH2M HILL for review and approval before the start of fieldwork. Subcontractors must comply with the established health and safety plan(s). CH2M HILL must monitor and enforce compliance with the established plan(s).

Subcontractor: DJN Inc.
Subcontractor Contact: Bill Hudson
Telephone: 208/7869011

Subcontractor: Pyrite Hydrochem
Subcontractor Contact: John Riley
Telephone: 208/773-5223

General health and safety communication with subcontractors contracted with CH2M HILL and covered by this plan is to be conducted as follows:

- Request that the subcontractor, if a specialty subcontractor, submit a safety or health plan applicable to their expertise (e.g., drill-rig safety plan or nuclear density gauge [NDG] health plan); attach the reviewed plan.
- Supply subcontractors with a copy of this plan, and brief them on its provisions.
- Direct health and safety communication to the subcontractor-designated safety representative.
- Notify the subcontractor-designated representative if a violation of the plan(s) is observed. Specialty subcontractors are responsible for mitigating hazards in which they have expertise.
- If a hazard condition persists, inform the subcontractor. If the hazard is not mitigated, stop affected work as a last resort and notify the project manager.
- When an apparent imminent danger exists, promptly remove all affected personnel. Notify the project manager.
- Make clear that consistent violations of the health and safety plan by a subcontractor may result in termination of the subcontract.

5 PERSONAL PROTECTIVE EQUIPMENT (PPE)

(Reference CH2M HILL SOP HS-07, *Personal Protective Equipment*, HS-08, *Respiratory Protection*, Section 2 of the *Site Safety Notebook*)

5.1 PPE SPECIFICATIONS

Task	Level	Body	Head	Respirator [b]
General work uniform for underground work	D	Work clothes Steel-toe, steel-shank acid resistant boots or waders Acid resistant work gloves	Hardhat [c] Safety glasses Mine Lamp	Self Rescuer required for work underground per MSHA

At least 2 bottles of buffered eyewash solution must be carried into the mine in all areas with groundwater

[a] Modifications are as indicated. CH2M HILL will provide PPE to only CH2M HILL employees.
[b] No facial hair that would interfere with respirator fit is permitted.
[c] Hardhat and splash-shield areas are to determined by the MSHA trained individual for underground mine work or SSC for hazwoper tasks.

6 AIR MONITORING SPECIFICATIONS

No air monitoring or air sampling is required for this project.

14 APPROVAL

This site safety plan has been written for use by CH2M HILL only. CH2M HILL claims no responsibility for its use by others unless specified and defined in project or contract documents. The plan is written for the specific site conditions, purposes, dates, and personnel specified and must be amended if those conditions change.

14.1 AMENDMENTS

CHANGES MADE BY:	DATE:
Jim Bushnell	5/6/98

CHANGES TO PLAN: Add new tasks, add names to section 4.1, change PM, change project No., remove air monitoring requirements

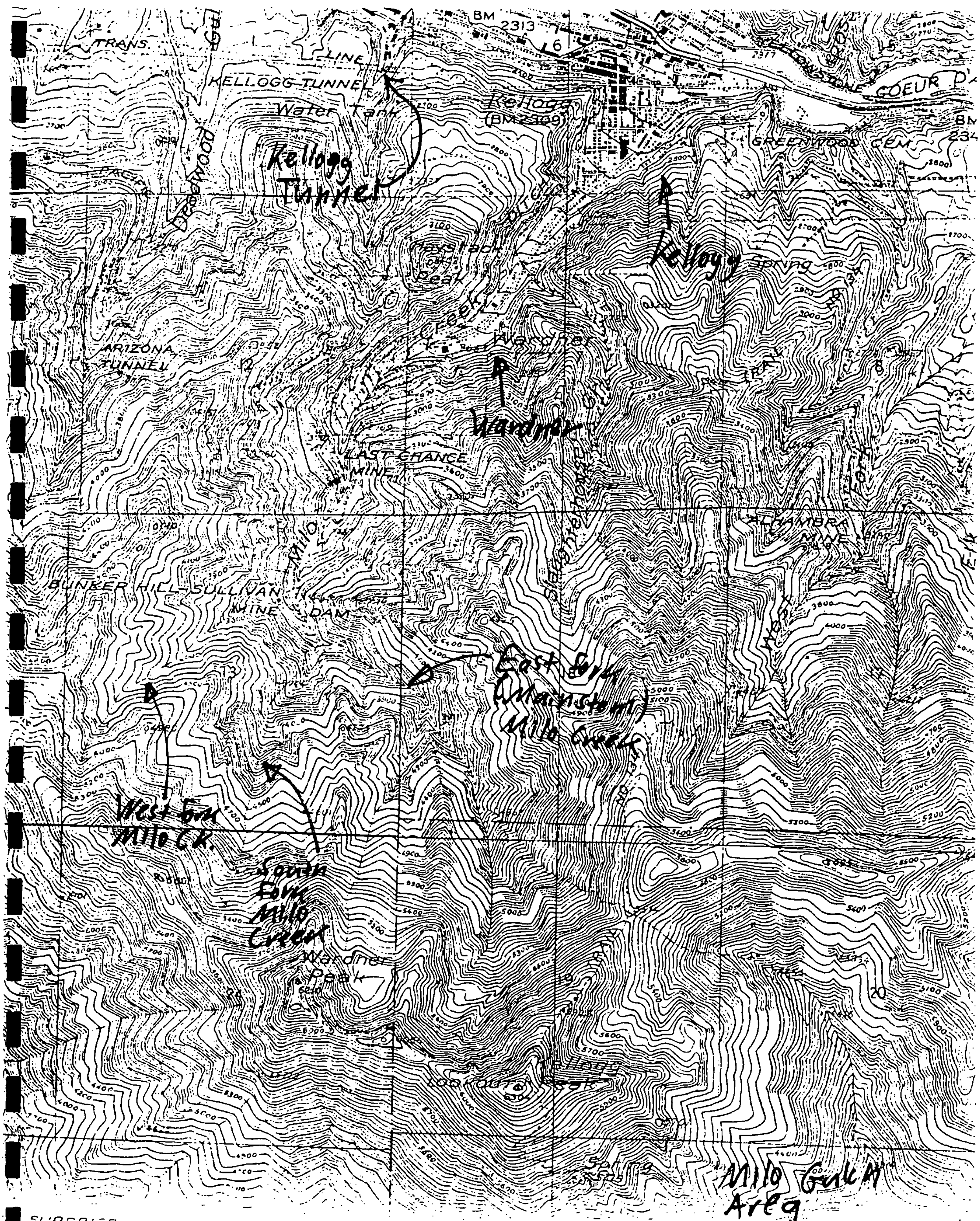
AMENDMENT APPROVED BY:	DATE:
	October 14, 1998

15 DISTRIBUTION

Name	Office	Responsibility	Number of Copies
Jim Bushnell	SEA	Health and Safety Manager/Approver	1
Jim Stefanoff	SPK	Project Manager	1
Bill Hudson	Bunker Hill	Field Technical Leader/MSHA trained	1
Mary Kay Voytilla	EPA	Client Project Manager	1

16 ATTACHMENTS

1. Figure of Milo Gulch
2. Employee Sign Off
3. Route to Hospital

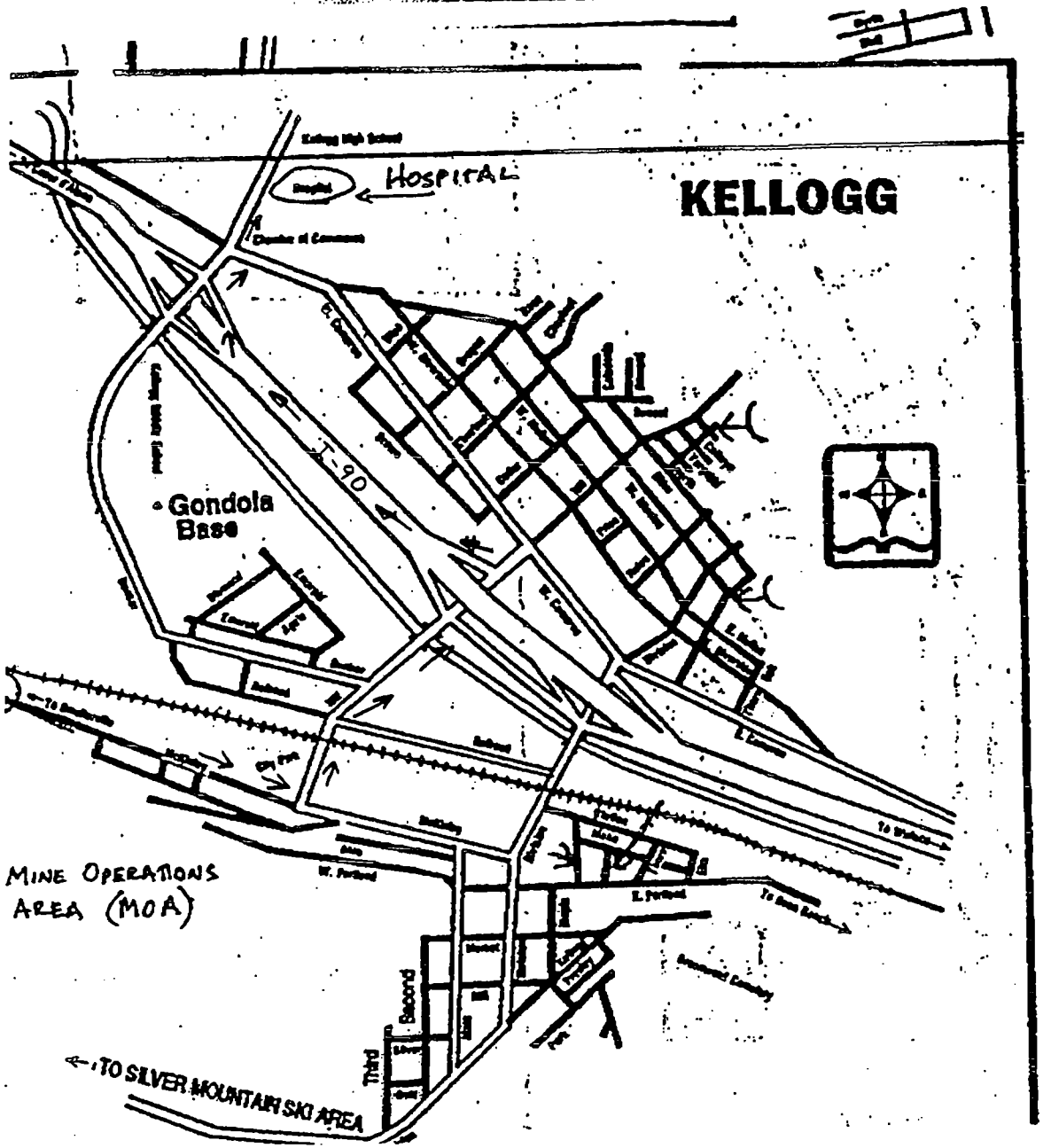

BM 2313
TRANS.
LINE
KELLOGG TUNNEL
Water Tank
Kellogg Tunnel
Kellogg
(BM2309)
GREENWOOD CEM
COEUR D'A
Deadwood
Haystack Peak
Kellogg
Spring
Creek
Wardner
ARIZONA TUNNEL
LAST CHANCE MINE
ALHAMBRA MINE
Milo
BUNKER HILL-SULLIVAN MINE
DAM
East Fork (Mainstem) Milo Creek
West Fork Milo CR.
South Fork Milo Creek
Wardner Peak
Kellogg Lookout Peak
Milo Gulch Area
SURPRISE

Attachment 1
Employee Signoff

EMPLOYEE SIGNOFF

The employees listed below have been given a copy of this health and safety plan, have read and understood it, and agree to abide by its provisions.

EMPLOYEE NAME	EMPLOYEE SIGNATURE AND DATE



Directions To Hospital:

From the Mine Operations Area (MOA), Go East on Mckinley. Take the first Left. Go under the Freeway, Take I-90 West, take the first Exit (Bunker Avenue), Proceed North 1/2 Block to Hospital.

SHOSHONE MED. CTR.
JACOBS GULCH
KELLOGG IDAHO
(208) 784-1221